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CLARK FORK RIVER
MACROINVERTEBRATE COMMUNITY BIOINTEGRITY
1986 through 1992

prepared for
Montana Department of Health
and Environmental Sciences
Water Quality Bureau
Helena, MT

prepared by
Daniel L. McGuire
Aquatic Biologist
Espanola, NM

October, 1993

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SUMMARY

The Montana Department of Health and Environmental Sciences Water Quality Bureau has conducted annual macroinvertebrate surveys in the Clark Fork River Basin since 1986. Samples were collected during August at approximately 25 stations from Silver Bow Creek in the headwaters to the Clark Fork above Thompson Falls Reservoir on the lower river, a distance of about 300 miles. In this report, the 1991 and 1992 data are presented and the 1986-92 data are re-analyzed.

The analysis protocol presented herein was developed specifically for the Clark Fork River drainage and builds on concepts and techniques used in the U. S. EPA Rapid Bioassessment Protocols. Ten measures of macroinvertebrate structure and function were incorporated into a single index of biological integrity. In addition, subsets of metrics sensitive to organic and metals pollution were used to quantify the relative severity of those pollutants.

The biological integrity of macroinvertebrate assemblages reflected the wide range of environmental conditions and water quality in the Clark Fork River drainage. On a scale of 0 to 100%, biointegrity ranged from 12 to 94%. Environmental impacts were severe in Silver Bow Creek and, with a few significant exceptions, diminished with distance downstream. Biointegrity in the upper Clark Fork River was much better than in Silver Bow Creek, but remained slightly to moderately impaired. Biological conditions generally improved from the Clark Fork's origin (station 7) downstream to Turah (station 13). This trend was interrupted at Deer Lodge and again at Bonita, where mean biointegrity declined. Biointegrity was usually slightly impaired in Clark Fork River downstream from the confluence of the Blackfoot River. Environmental stresses were relatively minor in the middle and lower Clark Fork; although, biointegrity was slightly more depressed from Harpers Bridge to Alberton. This general pattern was consistent for all seven years of monitoring.

Silver Bow Creek was severely polluted by metals, nutrients and organic pollutants throughout the seven year monitoring period. Metals toxicity depressed biological integrity and restricted the benthic fauna to a few tolerant species. Biological responses to nutrient and organic enrichment were usually limited in the prevailing toxic environment. When metals impacts diminished, organic pollution prevented significant improvement in biointegrity. Nutrients transported through Silver Bow Creek contributed to reduced biointegrity in downstream reaches.

The Warm Springs Ponds greatly reduced the severity of metals pollution in Silver Bow Creek. However, as toxicity was reduced, biological responses to organic enrichment became pronounced. Biological integrity, although slightly higher than above the ponds, was severely depressed by organic pollution.

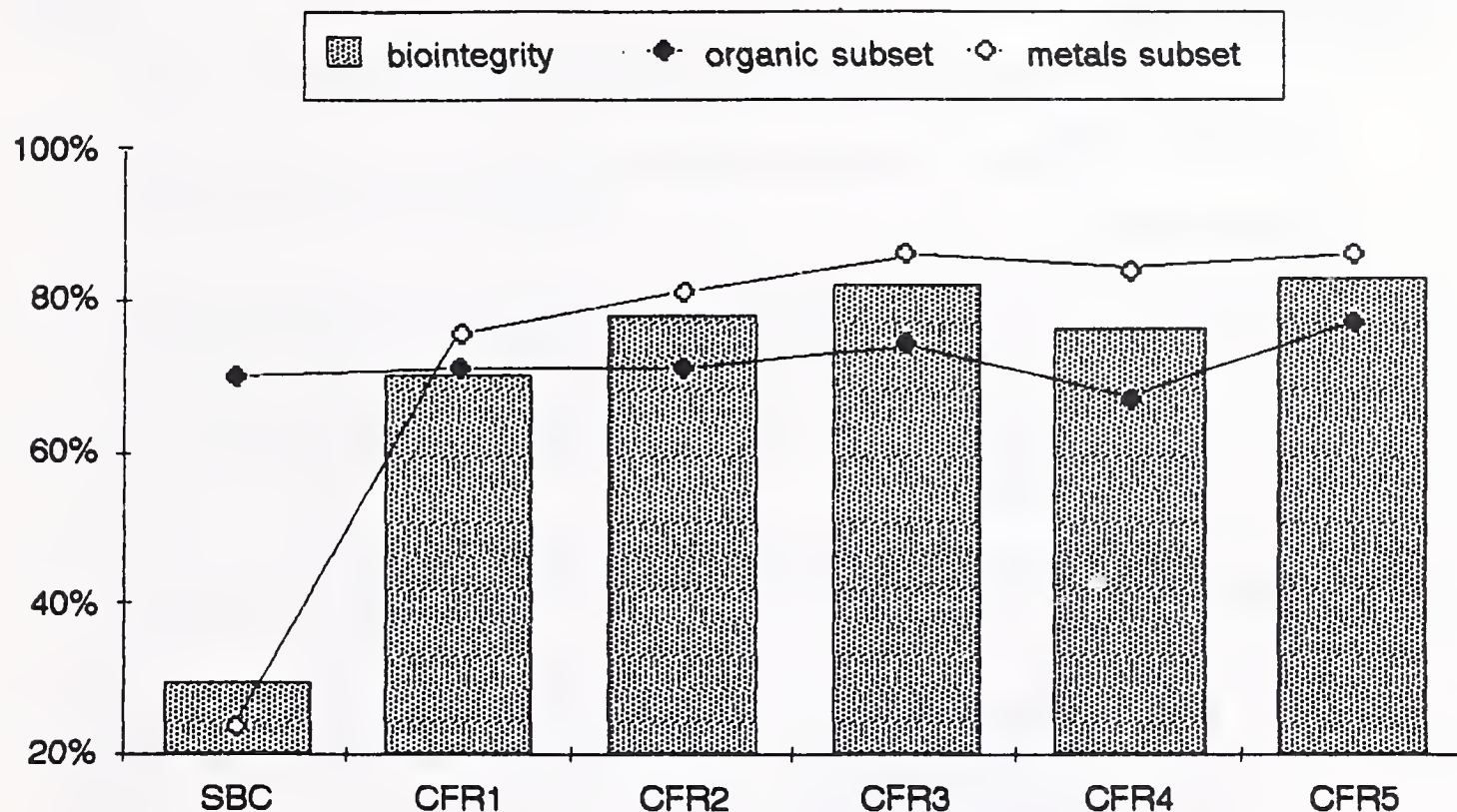
Biological integrity improved significantly in Warm Springs Creek during the monitoring period and, despite partial dewatering, macroinvertebrate biointegrity was nonimpaired during 1991 and 1992. Warm Springs Creek improved water quality in the Clark Fork River by diluting metals and nutrients and by enhancing the buffering capacity to metals toxicity.

Both metals and organic pollution reduced biointegrity in the upper Clark Fork River as far downstream as Rock Creek. Metals impacts were most severe at the uppermost station and generally declined with distance downstream. As metals impacts diminished, the large nutrient load was finally assimilated and organic pollution was a major cause of impairment in the Clark Fork River. Biointegrity was highest below the confluence of Rock Creek at Turah and, since 1989, above Deer Lodge. Biointegrity improved significantly at stations on the Clark Fork River near Dempsey and at Sager Lane during the last three years of monitoring.

The lower Blackfoot River was among the healthiest stations in the study area and, below the Blackfoot's confluence, biointegrity in the Clark Fork River was only slightly impaired. Impairment due to metals was negligible below the Blackfoot River. Mild organic pollution caused a slight loss of biological integrity from Missoula downstream to the Flathead River. Deleterious impacts were most evident from Harper Bridge to Albion.

For the study area as a whole, there was a significant trend of increasing biointegrity from 1986 to 1992. The improvement was modest, as mean biointegrity improved from 65% in 1986 to 71% in 1991 and declined to 69% in 1992. For the seven year monitoring period, 20 of 24 stations exhibited weak positive trends. However, a statistically significant trend was evident at only one station, the Clark Fork near Dempsey. Impacts from organic/nutrient pollution were particularly wide-spread and severe during years of low stream flow.

Mean biointegrity (%) of stream reaches in the Clark Fork River Basin during August, 1986 to 1992. The metals and organic subsets consisted of metrics considered most sensitive to each type of pollution.



Stream reaches: SBC = Silver Bow Creek, CFR1 = Clark Fork River from Warm Springs Creek to the Little Blackfoot River, CFR2 = Clark Fork River from the Little Blackfoot River to Turah, CFR3 = Clark Fork River from the Blackfoot River to the Bitterroot River, CFR4 = Clark Fork River from the Bitterroot River to Albion, CFR5 = Clark Fork River from Albion to the Flathead River.

Mean biointegrity (%) in the Clark Fork River Basin during seven years of monitoring (100 samples per year).

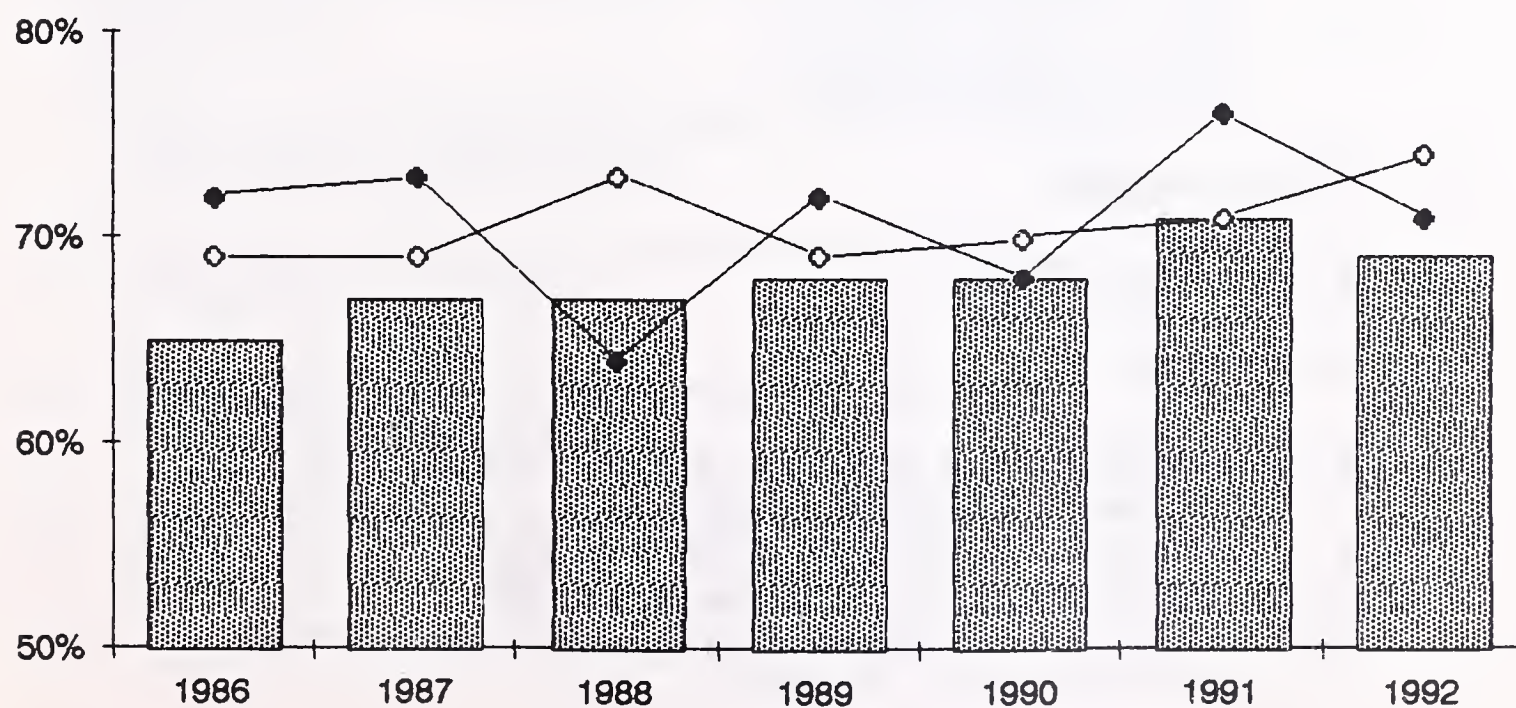


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1. INTRODUCTION

As part of a comprehensive environmental surveillance program of the Clark Fork River and selected tributaries, the Montana Department of Health and Environmental Sciences Water Quality Bureau conducts annual aquatic macroinvertebrate surveys. The program began in 1984 as a water quality study of the lower 230 miles of the Clark Fork (Ingman 1985). The program has evolved and since 1986, benthic organisms have been monitored at 25 locations in approximately 300 miles of the drainage from Silver Bow Creek to Thompson Falls Reservoir.

Macroinvertebrates are good indicators of water quality and environmental conditions and are commonly used to evaluate environmental impacts to streams. Healthy streams support diverse and dynamic macroinvertebrate assemblages that include mayflies (Ephemeroptera), stoneflies (Plecoptera) caddisflies (Trichoptera), true flies (Diptera), beetles (Coleoptera) and many others. These organisms provide energy pathways from primary producers (algae) and organic material to consumers (fish, humans, etc.). Because they are an integral component of stream ecosystems, macroinvertebrate communities change when pollutants are present. Impacts from sediments, nutrients and organics, metals and other toxic substances include characteristic changes in the macroinvertebrate community. A stream's biointegrity, or "the capability of supporting and maintaining a balanced, integrated, adaptive community having species composition, diversity and functional organization comparable to that of natural habitat of the region" (Karr and Dudley 1981) can be assessed using macroinvertebrates.

Previous reports (McGuire 1987, 1989a & b) provided information useful for water quality management by characterizing macroinvertebrate assemblages throughout the river, evaluating environmental impacts at each station and providing a baseline for future monitoring. McGuire (1990) evaluated the 1986-88 data for differences among years and stream reaches. Wisseman (1993) developed an integrated assessment of metrics based on the U.S. EPA Rapid Bioassessment Protocols (Plafkin et al. 1989) to evaluate the 1986-90 data. In this report, the integrated assessment is refined and the 1991 and 1992 data are added to the database. This approach provides a holistic assessment of biological integrity that is less ambiguous and more easily interpreted than the sometimes contradictory interpretations of individual metrics.

2. STUDY AREA

Since 1986, macroinvertebrates have been collected during early to mid-August at approximately 25 sites between the headwaters of Silver Bow Creek (SBC) and Thompson Falls Reservoir (Figure 1 and Table 1). A few changes in monitoring locations have been made over the years. Station 00, above the Butte municipal wastewater treatment plant (WWTP), was added in 1987. In 1989, stations 15 and 16 were replaced by an intermediate, station 15.5. Station 08.5 was added in 1990. The discharge from the Warm Springs Ponds was relocated in 1992 and station 04 was dropped as a biological monitoring site.

3. METHODS

3.1 Field Work

Benthic macroinvertebrates were collected by Montana Water Quality Bureau staff during the second week of August during 1991 and 1992. Collection methods were consistent with those used since 1986. A modified Hess sampler (0.1 sq. meter diameter, 1000 micron mesh netting) was used to collect four replicate samples at most stations. However, low stream flows during August, 1992 prevented Hess sampling at two headwater sites and traveling kicknet samples were collected from Mill-Willow Bypass and Warm Springs Creek (stations 05 and 06, respectively).

3.2 Laboratory Analysis

Laboratory methodology was consistent with that employed in previous years. To facilitate the recovery of small organisms, rose bengal dye was added to each sample. In most cases, the entire sample was processed using the following procedure. Samples were rinsed in a U.S. Standard #30 sieve to remove the preservative. A small portion of the sample was placed in an enamel pan and all macroinvertebrates were removed and sorted to order. This process was repeated until the entire sample was processed.

Figure 1.
Clark Fork Basin
Monitoring Project



Table 1. Clark Fork Basin Project - macroinvertebrate stations.

station	river mile	name
00	-28.0	Silver Bow Creek above Butte WWTP
01	-27.0	Silver Bow Creek below Colorado Tailings
02	-17.0	Silver Bow Creek at Miles Crossing near Ramsey
03	-6.0	Silver Bow Creek at frontage road above AMC Warm Springs treatment ponds
04	-2.0	Discharge from AMC Warm Springs treatment ponds
05	-2.0	Mill-Willow creeks bypass at mouth
06	-0.5	Warm Springs Creek at mouth
07	0.0	Clark Fork River below Warm Springs Creek
08	8.0	Clark Fork River near Dempsey
08.5	13.0	Clark Fork River at Sager Lane
09	21.0	Clark Fork River at Deer Lodge
10	36.0	Clark Fork River above Little Blackfoot River
11	46.5	Clark Fork River at Gold Creek Bridge
12	96.5	Clark Fork River at Bonita
13	113.5	Clark Fork River at Turah
14	119.5	Blackfoot River near mouth
15	122.0	Clark Fork River below Milltown Dam
15.5	123.5	Clark Fork River at Missoula city limits
16	129.4	Clark Fork River above Missoula WWTP
18	131.5	Clark Fork River at Shuffield's
19	134.5	Bitterroot River near mouth
20	142.0	Clark Fork River at Harper Bridge
22	154.0	Clark Fork River at Huson
23	164.5	Clark Fork River near Alberton
24	202.5	Clark Fork River at Superior
25	242.0	Clark Fork River above Flathead River
27	266.5	Clark Fork River above Thompson Falls Reservoir

Samples containing more than 1,000 macroinvertebrates were usually subsampled using a modification of the technique suggested by the U.S. EPA (Plafkin et al. 1989). Subsamples consisted of approximately 500 organisms and, depending on the estimated number of organisms in the sample, represented 20 to 50% of the entire sample. To obtain a subsample, a portion of the sample was evenly distributed in an enamel pan divided into 10 equal areas by a grid. All organisms were removed from two or more randomly selected grids. This process was repeated until the entire sample was processed. The number of grids searched was constant for all subsamples of sample. Densities in subsamples were multiplied by the appropriate correction factor to provide densities per 0.1 m Hess sample. A qualitative search for rare taxa in the unpicked portion of the sample was conducted by an experienced entomologist and, if not present in the subsample, these were added to the sample tallies.

As a quality assurance measure, at least five samples from each year were resorted. Sorting efficiency was calculated by dividing the number of organisms in the initial sort by the number of organisms in the initial sort + resort. For the 1991 samples, initial sorting efficiency averaged less than 95% and, consequently, 82 samples were completely resorted. Subsequent checks of sorting efficiency averaged 99% for 1991 and 98% for 1992. Organisms were identified to the lowest level, usually genus or species, that was consistent with past years. A few name changes and inconsistencies were present in the present study and previous years. These were reevaluated and nomenclature was standardized for all years.

3.3 Data Analysis

The analysis used to evaluate environmental conditions in the Clark Fork River was fashioned after RBP protocols (Plafkin et al. 1989). The average value per Hess sample was used for all metrics. Ten measures of macroinvertebrate community structure and function (Table 2) were incorporated into a single index of biological integrity. Each metric provided a different measure of the benthic community and, by combining a number of indices, the reliability and sensitivity of the overall evaluation was enhanced. Since biological communities integrate the effects of all environmental stresses, this analysis provided a measure of cumulative impacts. To determine biological integrity, each metric was assigned a score (0 to 6) based on its comparability to a reference value. Scores for all metrics were totaled and the sum, expressed as a percentage of the maximum possible score, was used as an estimator of biological integrity.

Selected metrics were used to compare the relative severity of metals and organic/nutrient pollution at each station. Because macroinvertebrates exhibit different responses to various types of environmental stress, the sensitivity of each metric differs. Some parameters are better estimators of organic enrichment while others are more sensitive to sediment deposition or toxic pollutants. Both organic/nutrient and metals pollution are known to degrade water quality and impact aquatic life in the Clark Fork Basin (Ingman and Kerr 1990, McGuire 1990). Consequently, subsets of metrics considered sensitive to organic/nutrient and metals impacts (Table 2) were used to identify the relative impacts of these pollutants. Scores for the three metrics in each subset were totaled and the sum, expressed as a percentage of the maximum possible score (18), provided an estimate of impacts attributable to each pollutant. The relative severity of metals and organic impacts were calculated as $:(100 - \% \text{ subset biointegrity})$. Metrics comprising the organic subset were community density, biotic index and percent relative abundance of filter-feeding macroinvertebrates. The subset used to quantify metals pollution consisted of community density, EPT richness and metals tolerance index.

Spearman rank correlations (Zar 1974) were used to test for temporal trends in biointegrity by station, stream reach and for the study area as a whole. To insure data comparability, metrics were recalculated for all previous years. The fixed reference for all stations and years facilitated the trend analysis. When indicated, a one-way analysis-of-variance (ANOVA) and Newman-Keuls range test (Zar 1974) were used to test for differences among years.

The metrics and scoring criteria (Table 1) were selected specifically for the Clark Fork Basin. Criteria were based on the ranges of values reported in the Clark Fork drainage (Averett 1961, Canton and Chadwick 1985, Chadwick et al. 1986, EA Engineering 1991, Ingman et al. 1990, Janik and Melancon 1982, McGuire 1984, 1987, 1989a & b, 1990, Montana Power Company 1982, Rades 1985, Spence 1975, and Wisseman 1993) and comparable streams throughout Montana (Kerr 1988, McGuire 1983a & b, 1992, unpublished data). Metrics and the rationale for their use are described below.

Macroinvertebrate Density

Total macroinvertebrate density is an important feature of community structure and, when carefully interpreted, can be a useful indicator of several different environmental conditions. Macroinvertebrate density tends to increase in response to organic and/or nutrient enrichment and the magnitude of the increase can be used to gauge the significance of the pollution. Conversely, macroinvertebrate density may be reduced by toxic substances such as metals, or severe habitat degradation.

Two metrics were based on macroinvertebrate density with unusually high and low densities considered indicative of environmental perturbation. Densities between 550 and 2,000 organisms per sample received maximum scores for both metrics. Densities greater than 2,000 per sample were attributable to organic pollution and/or enhanced primary production caused by nutrient enrichment. Since metals toxicity is well documented in the upper Clark Fork Basin (Ingman and Kerr 1990, many others), low macroinvertebrate densities were considered an index of metals pollution. Because toxic impacts can diminish typical biological responses to organic pollution (McGuire 1990), the organic metric (high densities) was not calculated when densities were suppressed below 550 organisms per sample (0.1 sq. meters).

Taxa Richness

Taxa richness, or the number of macroinvertebrate taxa per Hess sample, was probably the single best measure of environmental condition in the Clark Fork River drainage. It is a robust measure of biological integrity since the loss of the most sensitive species to any stress will affect the index. The range for scoring this metric was 14 to 40 taxa per Hess sample. A relatively narrow range, skewed toward the upper end of the scale, was used to maximize the sensitivity of this metric to forms of degradation causing small reductions in taxa richness.

Shannon Diversity

Shannon diversity is a widely used index of environmental condition (Weber 1973) and appeared to be a reliable measure of combined environmental stresses in the Clark Fork drainage. This index has two components and is influenced by taxa richness and the distribution of individuals among taxa (evenness). It was originally developed as a measure of organic pollution but does respond to other forms of environmental stress. Therefore, it was included as a general index of biological integrity.

EPT to Chironomidae Ratio (EPT/EPTC)

This metric, originally proposed by the EPA (Plafkin et al. 1989), is based on relative abundances of indicator groups. Most Ephemeroptera, Plecoptera and Trichoptera (mayflies, stoneflies and caddisflies, respectively) are considered sensitive to environmental stresses while Chironomidae, as a group, are more tolerant. Even distributions of individuals among all four groups reflects good biotic condition while a disproportionate number of chironomids indicates environmental stress. In the form $(E + P + T) \text{ divided by } (E + P + T + C)$, this metric ranges from 0 to 1 with low values (less than 0.55) indicating biological impairment.

Baetidae to Ephemeroptera Ratio

The family Baetidae is among the most pollution tolerant mayflies (Hubbard and Peters 1978) and environmental stress is indicated when baetids comprise a large proportion of the mayfly fauna. This metric ranges from 0 to 1 with high values (0.85) indicating biological impairment. When no mayflies were collected, this metric received a default value of 1.00.

Hydropsychinae to Trichoptera Ratio

The subfamily Hydropsychinae is, in general, more tolerant of pollution than most other caddisflies (Harris and Lawrence 1978). Environmental stress is indicated when most of the caddisflies in a sample are *Hydropsyche* and/or *Cheumatopsyche*. This metric is analogous to the Baetidae/Ephemeroptera metric and ranges from 0 to 1 with high values (0.85) indicating biological impairment. When no caddisflies were collected, this metric received a default value of 1.00.

Biotic Index

The biotic index is based on the indicator organism approach to water quality assessment and was developed to detect organic pollution. The tolerance values used in this study (Appendix A) were taken from Hilsenhoff (1987) and McGuire (1992). This index is on a scale of 0 to 10 with higher values indicating more polluted conditions.

Percent Relative Abundance of Filter Feeders

The relative abundance of functional feeding groups can provide useful insights into energy transfer, food resources and organic loading in aquatic ecosystems. Filter feeding insects typically comprise a major component (25 to 50%) of the summer macroinvertebrate fauna in Montana rivers. Relative abundances greater than about 50% indicate high seston (suspended organics) concentrations which are usually associated with organic/nutrient enrichment, extensive filamentous algae growth or lake outflows. This metric was used as a measure of organic pollution. Functional classifications were based on Merritt and Cummins (1984).

EPT Richness

This metric summarizes the species richness of Ephemeroptera, Plecoptera and Trichoptera and was used as an index of metals pollution. The majority of mayfly, stonefly and caddisfly species are highly sensitive to pollution. With a few exceptions, species in these groups are among the first to be eliminated by metals toxicity (Wiederholm 1984, Clements 1991). The wide scoring range used for this metric maximized sensitivity to toxic pollutants while minimizing the influences of other pollutants.

Metals Tolerance Index (MTI)

This metric was developed by the author to quantify changes in community composition caused by metals pollution. The format and calculation are based on Hilsenhoff's biotic index, with tolerance values assigned to each taxa based on sensitivity to heavy metals rather than organics. Tolerance values range from 0 to 10 (Appendix A) with higher values reflecting increasing tolerance to metals pollution. Tolerance values were assigned based on the author's interpretation of pertinent literature (Clements 1991, Clements et al. 1988, Rolin 1988, Wiederholm 1984, Winner et al. 1980, Yasuno et al. 1985, Lynch et al. 1988, Leland et al. 1989) and the distributions of taxa within metals contaminated reaches of the Clark Fork drainage. The index was calculated: $\sum \%RA_j (t_j)$, where $\%RA_j$ is the percent relative abundance of each taxon and t_j is the tolerance value of the taxon. MTI values for communities dominated by species intolerant of metals are less than 4 while values for communities comprised of only the most metals-tolerant species approach 10.

Table 2 . Metrics and scoring criteria used to determine biological integrity in the Clark Fork River Basin.

Metric	Scoring Criteria						
	6	5	4	3	2	1	0
General							
Taxa richness	>39	39-35	34-30	29-25	24-20	19-15	<15
Shannon diversity	>3.3	3.3-3.0	2.9-2.6	2.5-2.2	2.1-1.8	1.7-1.4	<1.4
EPT/EPTC	>.55	.54-.45	.44-.35	.34-.25	.24-.15	.14-.05	<.05
Hydropsychinae/Trichoptera	<.86	.86-.87	.88-.89	.90-.92	.94-.96	.97-.99	1.00
Baetidae/Ephemeroptera	<.86	.86-.87	.88-.89	.90-.92	.94-.96	.97-.99	1.00
Organic pollution subset							
Density	<2000	2000-2599	2600-3199	3200-3799	3800-4399	4400-4999	>5000
Biotic index	<4.0	4.0-4.5	4.6-5.1	5.2-5.7	5.8-6.3	6.4-6.9	>6.9
% Filterer	<51%	51-55%	56-60%	61-65%	66-70%	71-75%	>75%
Metals pollution subset							
Density	>550	549-450	449-350	349-250	249-150	149-50	<50
EPT richness	>22	21-18	17-14	13-10	9-6	5-2	<2
Metals Tolerance index	<4.0	4.0-4.9	5.0-5.9	6.0-6.9	7.0-7.9	8.0-8.9	>8.9

Each metric was scored from 0 (severe impact) to 6 (no impact).

Biointegrity was estimated as the sum of scores for all metrics expressed as the percentage of the maximum possible score.

Pecent biointegrity for metals and organic pollution subsets were based on a maximum possible score of 18.

4. RESULTS AND DISCUSSION

Identifications, enumerations, metric values and summary statistics for 1991 and 1992 samples are presented in Appendices B and C, respectively. For each station, average metric values, metric scores and percentage biointegrity assessments were calculated for each year that data were available (Appendix D). Biointegrity was expressed as a percentage of the maximum possible total score and provided a relative measure of community health. High % biointegrity indicated excellent water quality and optimal environmental conditions.

4.1 Biointegrity

Bioassessment scores ranged from 12 to 94% (Table 3) and reflected the wide range of water quality and habitat conditions within the study area. For the seven year monitoring period (Figure 2), biological condition was categorized as nonimpaired (90 to 100%), slightly impaired (70 to 90%), moderately impaired (50 to 70%), and severely impaired (<50%) using this assessment. Using this approach, Silver Bow Creek and the Warm Springs Pond #2 discharge (stations 00-04) were severely impacted while, during most years, the Mill-Willow Bypass (station 05) and Clark Fork River stations 07, 09, and 12 were moderately impaired. All other stations were slightly impaired or occasionally nonimpaired. On one or more dates, Warm Springs Creek, Blackfoot River, Bitterroot River (stations 06, 14 and 19, respectively) and Clark Fork River stations 13, 15, 18 and 24 were nonimpaired.

Biointegrity was lowest in the headwaters of Silver Bow Creek and generally increased with distance downstream (Figure 3). Biological condition improved slightly, but consistently, from the Colorado Tailings (station 01), to the Warm Springs Ponds (station 04). Benthic community health improved significantly in the Clark Fork mainstem where mean biointegrity increased from 61% below Warm Springs Creek (station 07) to 85% at Turah (station 13). This trend was interrupted at Deer Lodge (station 09) and again at Bonita (station 12) where biointegrity averaged 64 and 66%, respectively. The mean biointegrity of 88% at Sager Lane (station 08.5) was for the last three years of monitoring and may not be directly comparable to other station means.

Environmental stresses were less severe from Milltown Dam downstream to the Flathead River (stations 15-25) than in the upper Clark Fork. Biointegrity averaged 80% and ranged from 61 to 94% for this reach of the river (Table 3). Mean biointegrity (64%) was slightly depressed at Harper Bridge (station 20), with gradual recovery downstream. Impacts at this site were attributable to nutrient assimilation downstream from the Missoula WWTP.

4.1.1 Metals pollution

Combined scores for three metrics sensitive to metals pollution ranged from 0 to 100% with high scores indicating no impacts attributable to metals (Table 4). Silver Bow Creek (stations 00-03) continued to be seriously impacted by metals throughout the seven-year monitoring period. Metals pollution was significantly reduced below the Warm Springs Ponds and, compared to Silver Bow Creek, impacts were minor in the Clark Fork mainstem. The relative severity of metals impacts was estimated as: 100 - metals subset % biointegrity (Figure 3). Slight metals-related impacts were evident from Warm Springs Creek to Rock Creek (stations 07-12). Downstream from Rock Creek, metals caused only minor to no environmental stress.

4.1.2 Organic/nutrient pollution

Widespread organic and nutrient enrichment was a major cause of reduced biointegrity in much of the Clark Fork River (Figure 3). Combined scores for the three metrics most sensitive to organic pollution (Table 5) ranged from 17 to 100%. Except in the Blackfoot River, organic/nutrient pollution was evident throughout the study area. Biological impacts from nutrients were generally greatest in the Warm Springs Ponds outflow (station 4). Elsewhere, biological impairment due to organic and nutrient pollution was typically slight to moderate; although, more severe impacts occurred at several locations on a few dates.

4.1.3 Temporal trends

For the study area as a whole, there was a significant ($P = 0.01$), positive trend in the mean biointegrity scores from 1986 to 1992 (Table 2). The magnitude of the increase was modest, with mean biointegrity rising from 65% in 1986 to 71% in 1991. Mean study area biointegrity declined slightly, to 69%, in 1992. Spearman rank correlations indicated improved (positive r_s) biointegrity over time at 20 of the 24 stations with sufficient data for this analysis. However, the Clark Fork River near Dempsey (station 08) was the only station exhibiting a statistically significant temporal trend. Given only four to seven years of data, a near perfect correlation between biointegrity and year was required for statistical significance.

4.2 Stream Reaches

4.2.1 Silver Bow Creek (stations 00-04)

Biological integrity was severely impaired by metals and organic pollution throughout Silver Bow Creek. Metals remained the overwhelming cause of degradation above the Warm Springs Ponds (Figure 3). Temporal trends were not evident in Silver Bow Creek (Figures 4-8).

Biological effects of metals pollution (Table 4) were most severe above the Butte WWTP. Although metals concentrations generally increase from station 00 to station 03 (Ingman and Kerr 1990), there was a slight but consistent improvement in biological integrity (Table 3) from the Colorado Tailings (station 01) to the mouth of Silver Bow Creek (station 04). This apparent contradiction may reflect distances from potential sources of colonization and/or a buffering effect of organics in the Butte WWTP effluent.

The upstream site (station 00) supported a meager assemblage of only the most metals-tolerant species. The subset of metrics responsive to metals pollution had a mean value of 10% and ranged from 0% in 1987 and 1988 to 22% in 1990. Overall biointegrity averaged 23% and ranged from 15% in 1989 to 35% in 1991 (Figure 4).

Metals pollution was generally so severe as to preclude biological responses to other forms of pollution in Silver Bow Creek. However, severe organic/nutrient pollution was sometimes indicated (Table 5), particularly below the Butte sewage outfall (station 01) and the Warm Springs Ponds (station 04). When metals impacts were diminished, organic pollution prevented significant improvement in biointegrity. For example, metal concentrations below the Warm Springs Ponds were generally an order of magnitude less than in Silver Bow Creek (Ingman and Kerr 1990) and, in the less toxic environment below the ponds, organic pollution became more evident (Figure 3). Scores for organic-sensitive metrics averaged 47% at this site and were the lowest in the study area (Table 5). Similar conditions occurred in Silver Bow Creek during 1988 and 1992 (Figures 6 and 7). When the combined flows of Mill and Willow creeks were diverted into Silver Bow Creek above station 03 in the spring of 1992, biological responses to reduced metals concentrations were evident by August. Six metrics, including all three in the metals subset, indicated improved conditions compared with previous years (Appendix D.4). However, metrics sensitive to organic pollution declined and overall biointegrity remained severely depressed.

4.2.2 Mill-Willow Bypass (station 05)

The Mill-Willow Bypass was moderately impaired by metals and organic pollution (Figure 9) and, consequently, the combined flows of Mill and Willow creeks provided little dilution of pollutants in the upper Clark Fork River. Although biological integrity was slightly higher at this site than in Silver Bow Creek, it was lower than in downstream reaches (Figure 3).

Environmental impacts were more apparent during and following tailings removal and channel reconstruction (1990-91) than in previous years. Biointegrity was significantly lower (one-way ANOVA, $P = 0.05$) in 1991 than in 1986 through 1989. Data interpretation was complicated because low stream flows prevented Hess sampling in 1990 and 1992. In those years, single traveling-kicknet samples were collected. Kick sample data (Appendix C) were similar, but not directly comparable to Hess data. Using a suite of 6 metrics, kick samples were compared to the Rapid Bioassessment Protocols (RBP) Reference for Montana Foothills and Valleys streams (Bahls et al. 1992). In this assessment, biointegrity scores were 60% in 1990 and 53% in 1992. It seems likely that dewatering and stream channel disturbance temporarily accentuated impacts.

4.2.3 Warm Springs Creek (station 06)

Warm Springs Creek was moderately impaired in 1986 and was slightly to nonimpaired from 1987 through 1992 (Figure 10). The 1986 samples were collected following a February flood event which resulted in elevated metals concentrations. Biointegrity (Table 3) and metals impacts (Table 4) were significantly lower (ANOVA, $P = 0.05$) in 1986 than in subsequent years. Despite partial summer dewatering, biological integrity in Warm Springs Creek has recovered from episodic impacts in 1986.

Due to low stream flow in 1992, a traveling-kick sample was collected. Species composition was distinct from previous years and was dominated by low water velocity species (Appendix C). Metals sensitive species were common in the 1992 kick sample and the metals tolerance metric was less than 4.0. Compared to the RBP reference (Wisseman 1992, McGuire 1992), Warm Springs was rated at 93% in 1992. In 1990, Hess samples and a traveling-kick sample averaged 78% and 73%, respectively.

4.2.4 Clark Fork Reach 1 (stations 07-10)

Environmental condition was much improved in the Clark Fork River compared with Silver Bow Creek. Biointegrity averaged 70% in the river reach (CFR1) from Warm Springs Creek to the Little Blackfoot River, but was highly variable among stations and dates (Table 3). Mean biointegrity for the reach was lowest in 1986 following an episode of high metals concentrations associated with a mid-winter flood. Mean biointegrity peaked in 1991 and exhibited a significant trend of improvement ($P = 0.01$) during the seven year monitoring period. This was the only stream reach where a significant trend was documented. Metals pollution reduced biointegrity more in this reach than in downstream reaches; however, organic pollution also contributed significantly to reduced biointegrity in this reach.

The uppermost station (07) was generally the most impaired site on the Clark Fork mainstem (Figure 3). Both organic and metals pollution contributed to impacts at this site (Figure 11). Other forms of environmental degradation, such as partial dewatering and sediment deposition, were also indicated when overall biointegrity was lower than either the metals or organic subsets. Biological impairment was most severe at this site from 1988 to 1990.

Biointegrity improved significantly in the Clark Fork River near Dempsey (station 08) during the last three years of monitoring. Biointegrity averaged 68% from 1986 to 1989 but averaged 87% from 1990 to 1992 (Figure 12). Relatively high biointegrity was maintained downstream several miles to Sager Lane (Figure 13). Upstream assimilation of organics originating in the Warm Springs Ponds appeared to be the primary cause of improvement in this reach; although, metals impacts also declined slightly.

Biointegrity declined at Deer Lodge (station 09) as both metals (Table 4) and organic (Table 5) impacts became more severe. During most years, organic pollution appeared to be the most significant form of degradation (Figure 14). Biointegrity was particularly low during 1986 and 1992. A slight recovery was noted from Deer Lodge to above the Little Blackfoot River (station 10) on all dates (Table 3). Biointegrity averaged 64 and 72%, respectively, during seven years of monitoring at stations 9 and 10. Organic enrichment severely reduced biological health above the Little Blackfoot River in 1986 and was the principle cause of reduced biointegrity on most dates (Figure 15).

The severity of organic/nutrient impacts in this reach may be exacerbated by upstream metals impacts. If biological uptake of nutrients is limited in upstream reaches, the excess nutrients are transported downstream and contribute to elevated nutrient loads. The consequent increase in algal and bacterial production reduces biological integrity and causes a shift in macroinvertebrate community structure and function.

4.2.5 Clark Fork Reach 2 (stations 11-13)

The types and severity of pollution were highly variable in this reach and, consequently, biological impacts were difficult to characterize. During most years, impacts were most severe at Bonita, the middle station in this reach. Mean biointegrity was 82% at Gold Creek (station 11), 66% at Bonita (station 12) and 85% at Turah (station 13). Organic pollution was frequently the most serious cause of impacts in this reach and may have been increased by nutrients originating far upstream. Although metals impacts contributed to biological impairment at Gold Creek and Bonita, their severity was diminished compared to upstream sites (Table 4).

On most dates, the Gold Creek station was fairly healthy and biointegrity was higher than at upstream monitoring stations. Biointegrity was slightly diminished by a combination of slight metals and organic pollution (Figure 16). Relatively severe organic pollution was evident in 1990 when overall biointegrity and the organic subset declined to 63 and 42%, respectively.

At Bonita, organic pollution ranged from slight to severe and was the principle cause of biological impairment (Figure 17). Organic pollution was quite severe in 1988 and 1992. Biointegrity was highest at this site in 1987. Biological condition and pollution severity were similar to those at Deer Lodge.

The Clark Fork at Turah was the healthiest station in the upper Clark Fork River and biointegrity at this site compared favorably with stations in the middle river. Biointegrity was nonimpaired at this site in 1991 (Figure 18). On other dates, biointegrity was slightly impaired by mild organic pollution. Organic pollution was most severe and biointegrity was reduced to it's lowest level in 1988. Metals pollution was substantially reduced compared with upstream sites and significant metals impacts were absent below the Rock Creek confluence, which is bracketed by sites 12 and 13.

4.2.6 Blackfoot River (station 14)

The site on the lower Blackfoot River was among the healthiest stations in the study area. Biointegrity averaged 87% and ranged from 82 to 92%. The site was usually free of organic/nutrient pollution (Figure 19). Low macroinvertebrate densities slightly depressed biointegrity and the metals subset. However, metal-related impacts were not indicated by the metals tolerance index (Appendix D-16). Densities and taxa richness may have been suppressed by poor habitat, other pollutants or inherent low productivity.

4.2.7 Clark Fork Reach 3 (stations 15-18)

From Milltown Dam to the confluence of the Bitterroot River was among the healthiest reaches of the Clark Fork River (Table 3). Biointegrity averaged 82% while the organic and metals subsets averaged 74 and 86%, respectively. Dilution by the Blackfoot River and retention of metals in Milltown Reservoir improved biointegrity in this reach.

Although only three years of data were collected there (Figure 20), the site below Milltown Dam (station 15) had the highest biointegrity in the study area. Biointegrity was slightly lower at stations in Missoula (stations 15.5 and 16, respectively) than at adjacent stations. Slight nutrient enrichment was indicated (Figures 21 and 22) and habitat degradation limited biointegrity at these sites. Station 15 will be reestablished in 1993.

Impacts attributable to the Missoula WWTP discharge were not evident at Shuffield's (station 18) located below the mixing zone. During each year, biointegrity was slightly higher at this site than at stations above the Missoula WWTP discharge. Mean biointegrity at Shuffield's was 85% (Figure 23).

4.2.8 Bitterroot River (station 19)

Environmental conditions were fairly good in the lower Bitterroot River. While mild organic/nutrient enrichment (Table 5) and sediment deposition were indicated, biointegrity was relatively high (Table 2). Significant metals-related impacts were not detected. Biointegrity was highest in 1989 and lowest in 1986 (Figure 24); no temporal trend was apparent.

4.2.9 Clark Fork Reach 4 (stations 20-23)

Biological integrity was slightly diminished in this reach compared with adjacent stream reaches (Table 3). Mean biointegrity was 76% and organic pollution was the principle cause of impacts throughout the reach. Mean biointegrity was lowest at Harper's Bridge (station 20) and increased slightly downstream to Alberton (station 23). Biointegrity was consistently lower at Harper's Bridge than at Shuffield's (station 18). The impacts at Harper's Bridge were attributable to assimilation of nutrients from the Missoula WWTP and nitrogen from the Bitterroot River. Biological impairment was most severe during the 1988 drought which may have increased impacts from point sources. Impacts were least severe in 1989. No temporal trends were indicated (Figures 25-27).

4.1.10 Clark Fork Reach 5 (stations 24-25)

From Superior to the Flathead River, the Clark Fork supported a healthy benthic fauna. Mean biointegrity was the highest in the study area (Table 2). Slight organic enrichment was indicated (Table 4), but impacts were minimal. Metals pollution was negligible in this river reach. Biointegrity was highest in 1992 and lowest in 1989 (Figures 28-29). Temporal trends were not evident at these stations.

4.1.11 Lower Clark Fork River (station 27)

Only one site in the lower river, located above Thompson Falls Reservoir, has been monitored over several years. Biointegrity, and particularly, scores for the organic metric subset, indicated moderate to severe impacts (Figure 30). From 1987 to 1992, mean biointegrity was 67%. However, this analysis was designed to evaluate conditions in the upper and middle river basin and may not have accurately reflected biological condition in the lower Clark Fork. The Flathead River, which provides more than half of the stream flow, has a strong influence on conditions in this reach.

The environment in the lower river was much different than in upstream reaches and the relatively low bioassessment scores may have been due to limitations of the analysis rather than poor water quality. Station 27 was located in a depositional reach with smaller substrates than at most other stations and the benthic fauna was quite different at this site than elsewhere in the basin. Consequently, metrics sometimes gave contradictory results and the accuracy of the assessment for this location is questionable. For instance, organic pollution was contraindicated by low macroinvertebrate density. However, on three occasions community density fell below the threshold used to indicate toxic conditions and this metric was excluded from the analysis (Appendix D-27). When this occurred, the remaining two metrics in the organic pollution subset indicated rather severe degradation.

The macroinvertebrate community above Thompson Falls Reservoir may be typical of a relatively pollution-free large river with high summer water temperatures and fluctuating water levels. The dominant taxa were different than at upstream stations and the benthic assemblage included several taxa that were unique to this site. The limpet, *Fisherola nutalli*, was collected at this site in 1992. This species is a candidate for Endangered Species Act listing and has not been previously reported in Montana.

Table 3. Macroinvertebrate biointegrity (%) and Spearman rank correlation coefficients (rs) for Clark Fork River Basin stations and reaches - August, 1986-92.

Station	1986	1987	1988	1989	1990	1991	1992	Mean	C.V.(%)	rs	P value
00		18	32	15	22	35	17	23	36	.03	.96
01	38	15	32	12	26	23	18	23	40	-.32	.48
02	22	33	33	35	33	37	28	32	16	.33	.47
03	38	40	35	50	43	43	43	42	11	.63	.13
04	45	44	44	47	41	45		44	4	-.03	.96
05	58	61	68	61		43		58	16	-.21	.74
06	48	78	80	82	78	91		76	19	.75	.08
07	61	68	52	59	55	65	65	61	10	.09	.85
08	71	65	71	65	85	88	88	76	14	.75	.05
08.5					88	88	89	88	1		
09	50	65	62	73	61	83	55	64	17	.21	.65
10	52	68	71	80	79	86	68	72	15	.52	.23
11	86	80	85	88	63	89	85	82	11	.11	.82
12	64	80	59	77	61	64	56	66	14	-.52	.23
13	88	79	74	89	85	92	85	85	7	.29	.53
14	82	83	90	85	92	88	89	87	4	.61	.15
15	82	94	92					89	7		
15.5				77	68	79	82	77	8	.80	.20
16	70	82	83					78	9		
18	73	88	91	80	86	91	83	85	8	.23	.61
19	79	83	82	91	85	86	79	84	5	.22	.64
20	71	77	61	79	73	79	76	74	9	.40	.38
22	62	86	68	89	88	71	74	77	14	.32	.48
23	77	71	76	83	79	74	88	78	7	.46	.29
24	90	79	76	73	88	85	92	83	9	.29	.54
25	83	85	82	76	80	83	88	82	5	.13	.79
27		65	68	64	67	72	67	67	4	.38	.46
mean	65	67	67	68	68	71	69	69	3	.95	.001
Reach*											
SBC	33	27	33	28	31	35	27	30	11	-.09	.85
CFR1	59	67	64	69	74	82	73	70	11	.86	.01
CFR2	79	80	73	85	70	82	75	78	7	-.07	.88
CFR3	75	88	89	79	77	85	83	82	7	.07	.88
CFR4	70	78	68	84	80	75	79	76	7	.43	.34
CFR5	87	82	79	75	84	84	90	83	6	.31	.50

Stream reaches: SBC = stations 00-03, CF1 = stations 07-10, CF2 = stations 11-13, CF3 = stations 15-18
CF4 = stations 20-23, CF5 = stations 24-25.

Table 4. Macroinvertebrate biointegrity (%) as measured by metrics sensitive to metals pollution* and Spearman rank correlation coefficients (rs) for Clark Fork River Basin stations and reaches - August, 1986-92.

station	1986	1987	1988	1989	1990	1991	1992	Mean	C.V.(%)	rs	P value
00		0	0	11	22	17	11	10	87	.68	.14
01	39	6	44	33	44	33	28	32	40	-.15	.76
02	6	28	39	28	22	22	17	23	44	-.16	.73
03	22	17	44	28	22	28	50	30	41	.62	.14
04	61	61	61	67	67	61		63	5	.41	.41
05	61	72	67	72		50		64	14	-.21	.74
06	50	56	67	72	67	83		66	18	.90	.02
07	72	72	72	72	72	72	72	72	0	.00	1.00
08	78	72	72	72	72	83	83	76	7	.50	.26
08.5					83	83	83	83	0		
09	72	78	72	83	72	78	72	75	6	.00	1.00
10	92	78	78	67	78	83	78	79	9	-.22	.64
11	83	78	78	89	67	83	78	79	9	-.17	.72
12	78	83	83	78	72	78	78	79	5	-.46	.30
13	78	89	94	83	78	89	94	86	8	.37	.42
14	61	83	83	67	83	72	100	78	16	.52	.23
15	83	94	94					90	7		
15.5				72	78	83	83	79	7	.95	.05
16	83	89	89					87	4		
18	83	89	89	83	89	89	94	88	4	.66	.11
19	83	89	89	94	83	89	89	88	4	.24	.61
20	83	83	78	78	78	83	83	81	3	.00	1.00
22	83	89	83	89	78	83	83	84	5	-.34	.48
23	89	83	89	89	89	83	89	87	3	.00	1.00
24	89	83	89	83	94	83	94	88	6	.30	.51
25	67	89	94	83	89	83	89	85	10	.19	.89
27		72	78	72	78	78	78	76	4	.62	.19
mean	69	69	73	69	70	71	74	72	3	.70	.08
Reach											
SBC	22	13	32	25	28	25	27	24	24	.47	.29
CFR1	79	75	74	74	75	80	78	76	3	.22	.64
CFR2	80	83	85	83	72	83	83	81	5	.06	.90
CFR3	83	91	91	78	84	86	89	86	6	.02	.97
CFR4	85	85	83	85	82	83	85	84	2	-.30	.52
CFR5	78	86	92	83	92	83	92	86	6	.45	.31

*metals metric subset: metals tolerance index, EPT richness and community density.

Table 5. Macroinvertebrate biointegrity (%) as measured by metrics sensitive to organic pollution* and Spearman rank correlation coefficients (rs) for Clark Fork River Basin stations and reaches - August, 1986-92.

station	1986	1987	1988	1989	1990	1991	1992	Mean	C.V. (%)	rs	P value
00		83	83	58	75	83	67	75	14	-.39	.44
01	67	67	67	17	50	58	42	53	35	-.70	.08
02	83	83	50	92	92	75	92	81	19	.36	.43
03	83	83	33	100	83	75	42	71	34	-.33	.47
04	50	56	44	39	39	56		47	17	-.18	.74
05	58	61	78	56		42		59	22	-.60	.29
06	58	92	75	94	83	94		83	17	.67	.15
07	72	89	50	78	56	72	83	71	20	.05	.91
08	78	78	78	67	89	89	89	81	10	.69	.08
08.5					89	89	83	87	4		
09	56	67	50	61	44	89	50	60	25	-.14	.76
10	39	61	56	83	67	89	67	66	25	.76	.06
11	89	72	92	89	42	89	78	79	23	-.22	.63
12	72	83	33	67	61	50	44	59	30	-.61	.15
13	89	67	44	89	78	83	72	75	21	-.05	.91
14	100	83	83	100	100	100	94	94	9	.18	.70
15	83	83	89					85	4		
15.5				58	42	78	89	67	31	.80	.20
16	61	67	72					67	8		
18	67	89	94	78	72	89	61	79	16	-.25	.59
19	72	72	72	83	72	78	67	74	7	-.10	.83
20	67	67	39	78	67	72	61	64	19	.04	.93
22	61	78	50	89	92	61	61	70	23	.07	.88
23	67	56	67	72	67	61	83	68	13	.46	.36
24	83	72	61	61	78	83	89	75	15	.44	.33
25	92	83	72	72	72	83	83	80	10	-.23	.62
27		42	56	56	33	50	61	50	21	.35	.50
mean	72	73	64	72	68	76	71	71	5	-.05	.91
Reach											
SBC	78	79	58	67	75	73	61	70	12	-.50	.25
CFR1	61	74	59	72	69	86	74	71	13	.56	.19
CFR2	83	74	56	82	60	74	65	71	15	-.40	.38
CFR3	70	80	85	68	57	84	75	74	13	-.04	.94
CFR4	65	67	52	80	75	65	68	67	13	.34	.45
CFR5	88	78	67	67	75	83	86	77	11	.02	.97

*organic metric subset: biotic index, % filterers and community density.

Figure 2. Biointegrity (%) at stations in the Clark Fork River drainage during August, 1986 to 1992.

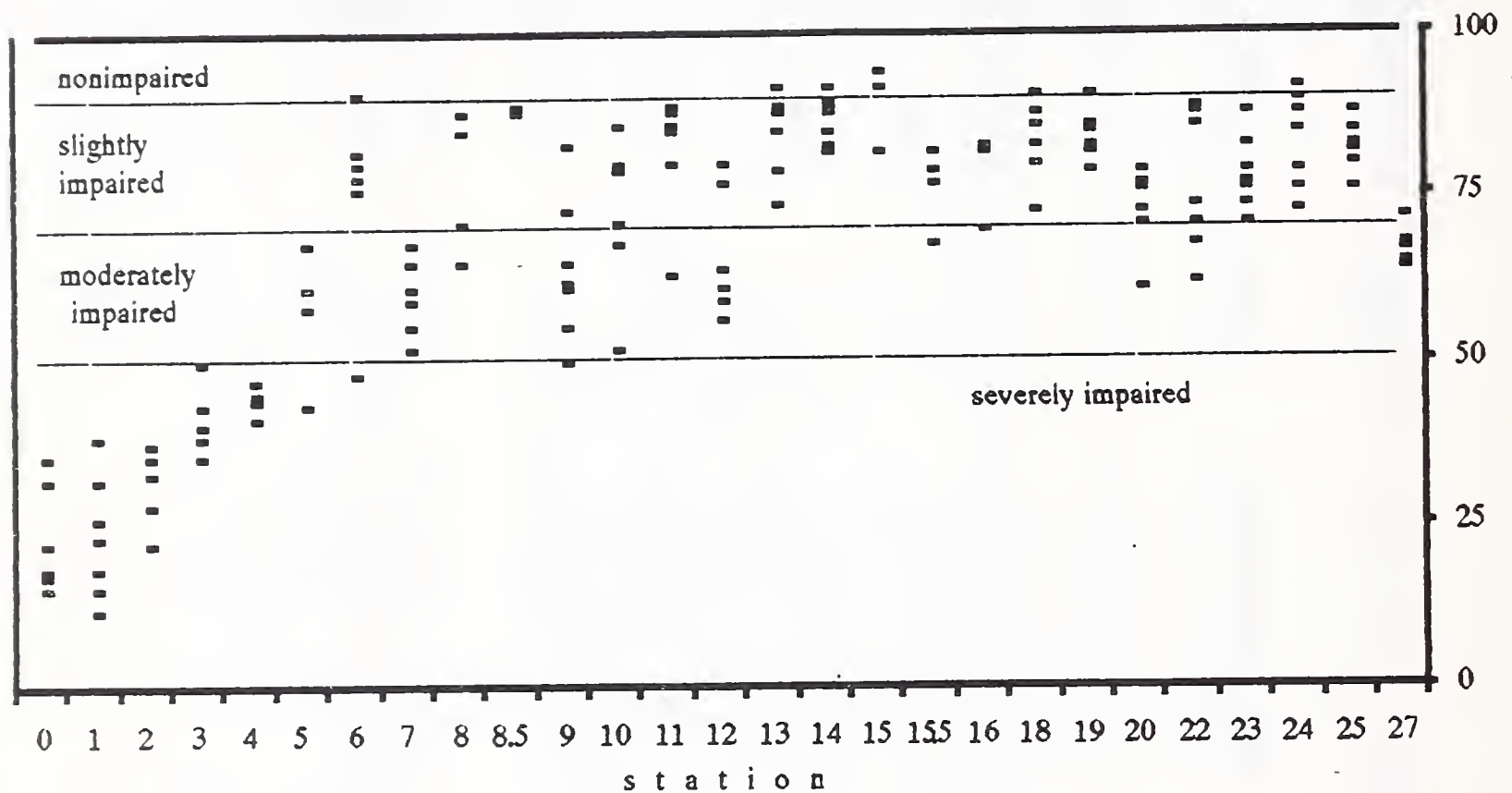


Figure 3. Mean biointegrity (%) and the relative severity of organic and metals pollution at stations in the Clark Fork River drainage, 1986 to 1992.

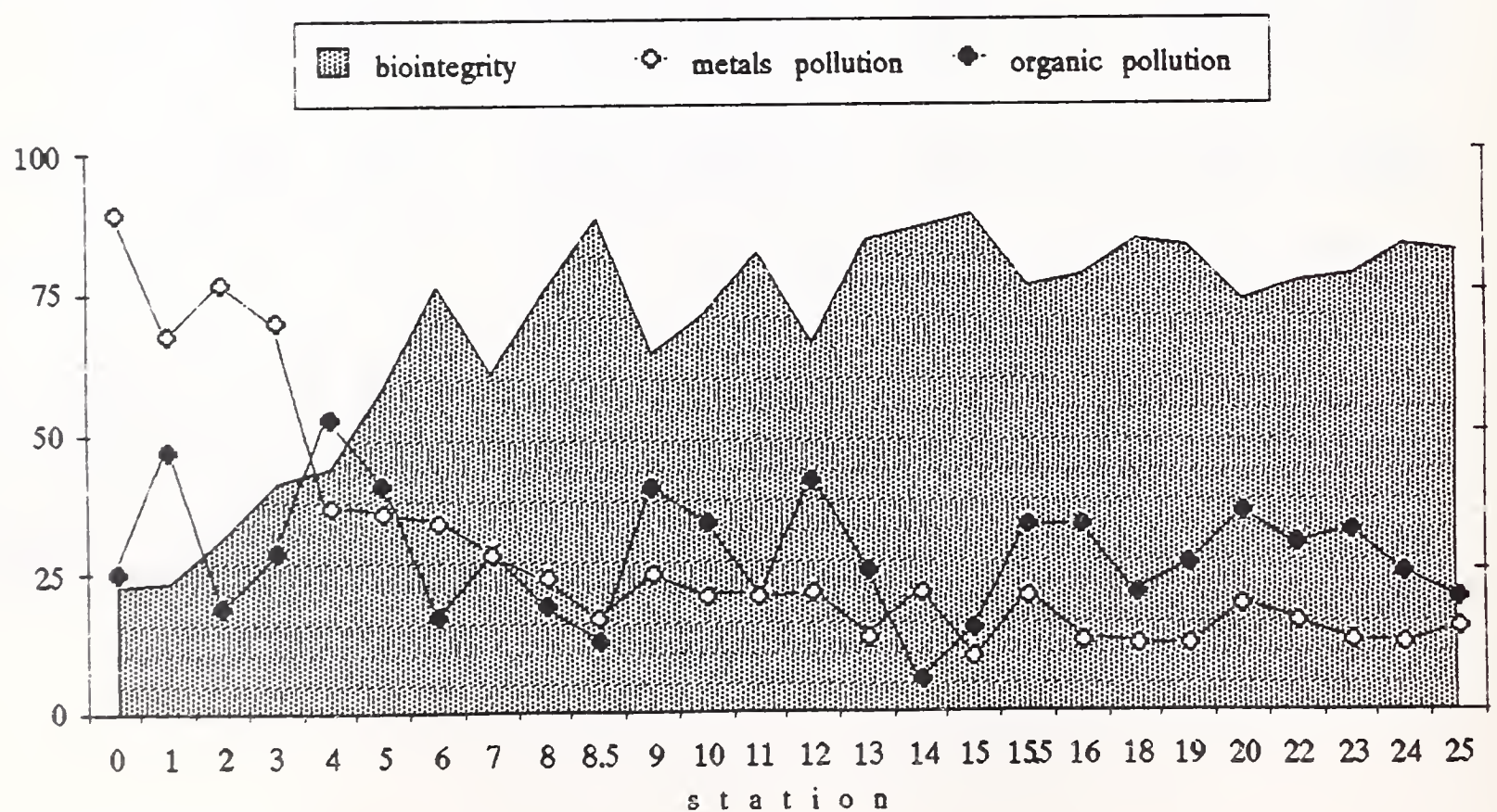


Figure 4. Biointegrity (%) in Silver Bow Creek above the Butte WWTP: station 00, 1987 to 1992.

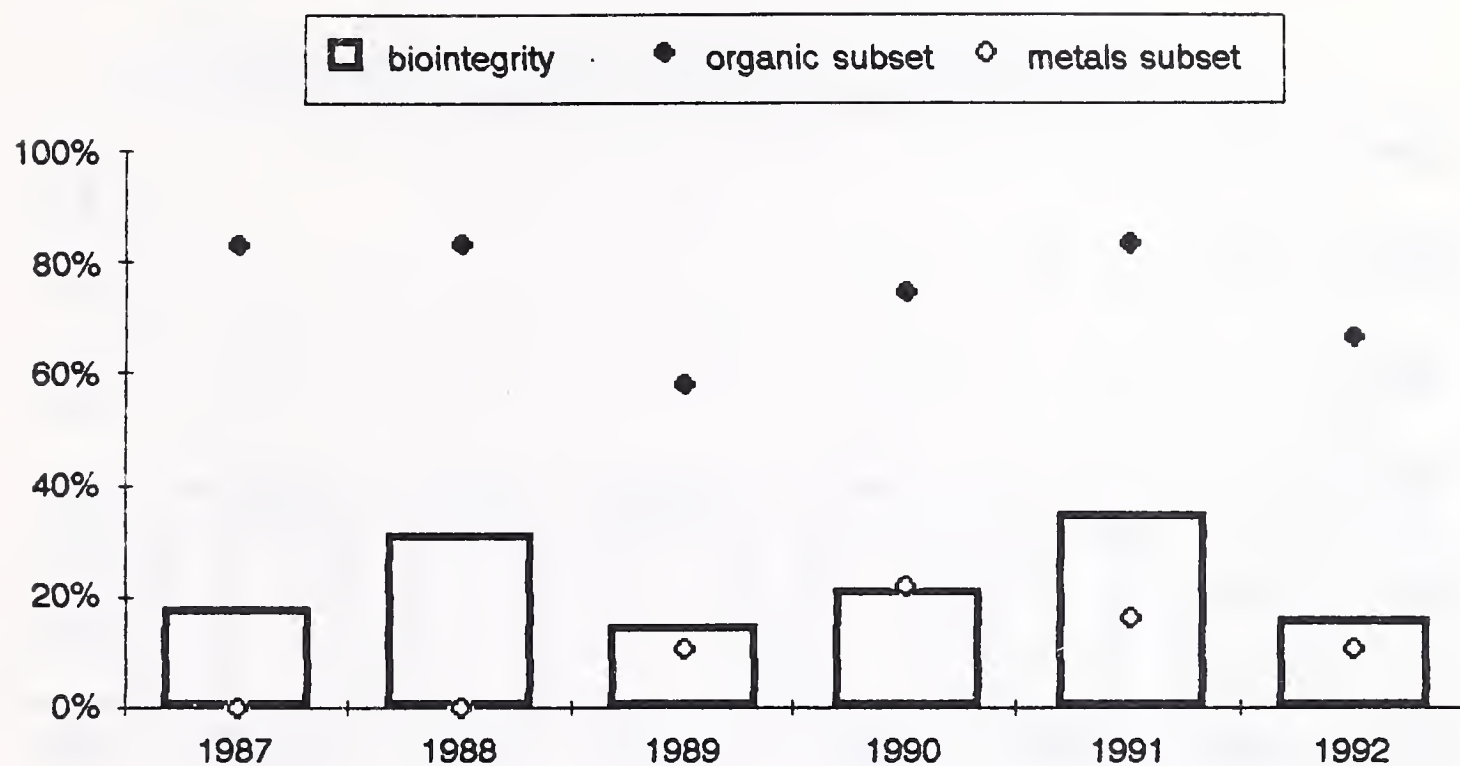


Figure 5. Biointegrity (%) in Silver Bow Creek below the Colorado Tailings: station 01, 1986 to 1992.

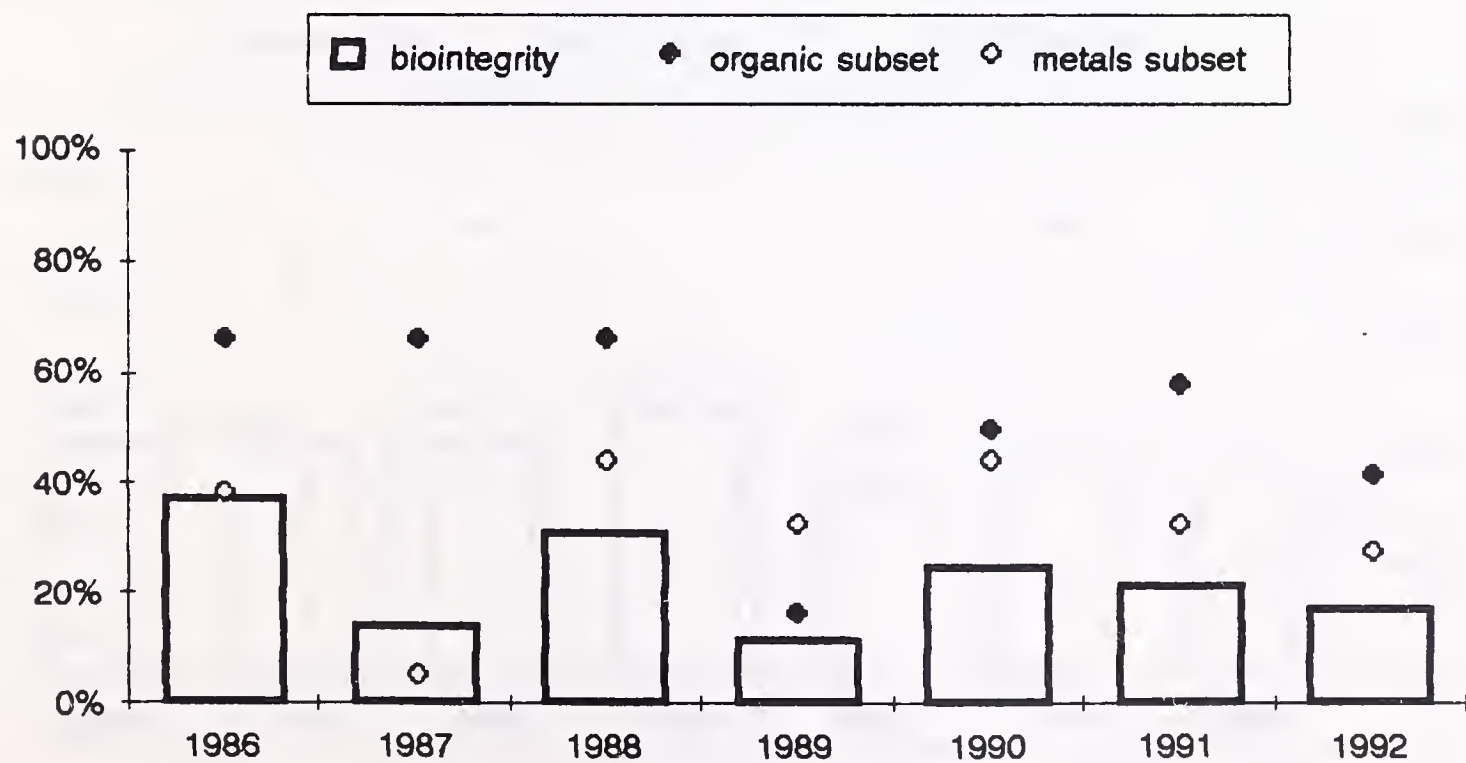


Figure 6. Biointegrity (%) in Silver Bow Creek at Miles Crossing near Ramsey: station 02, 1986 to 1992.

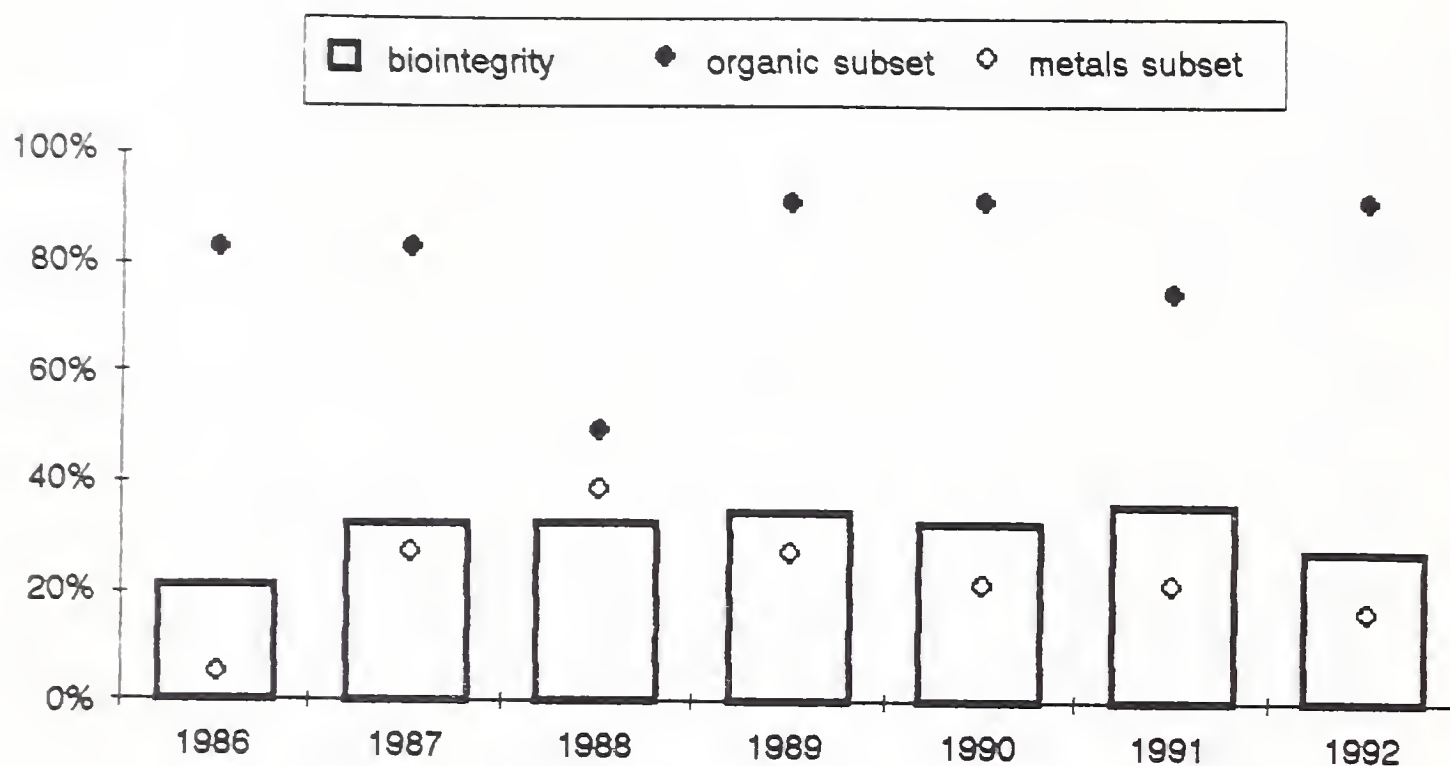


Figure 7. Biointegrity (%) in Silver Bow Creek above the Warm Springs ponds: station 03, 1986 to 1992.

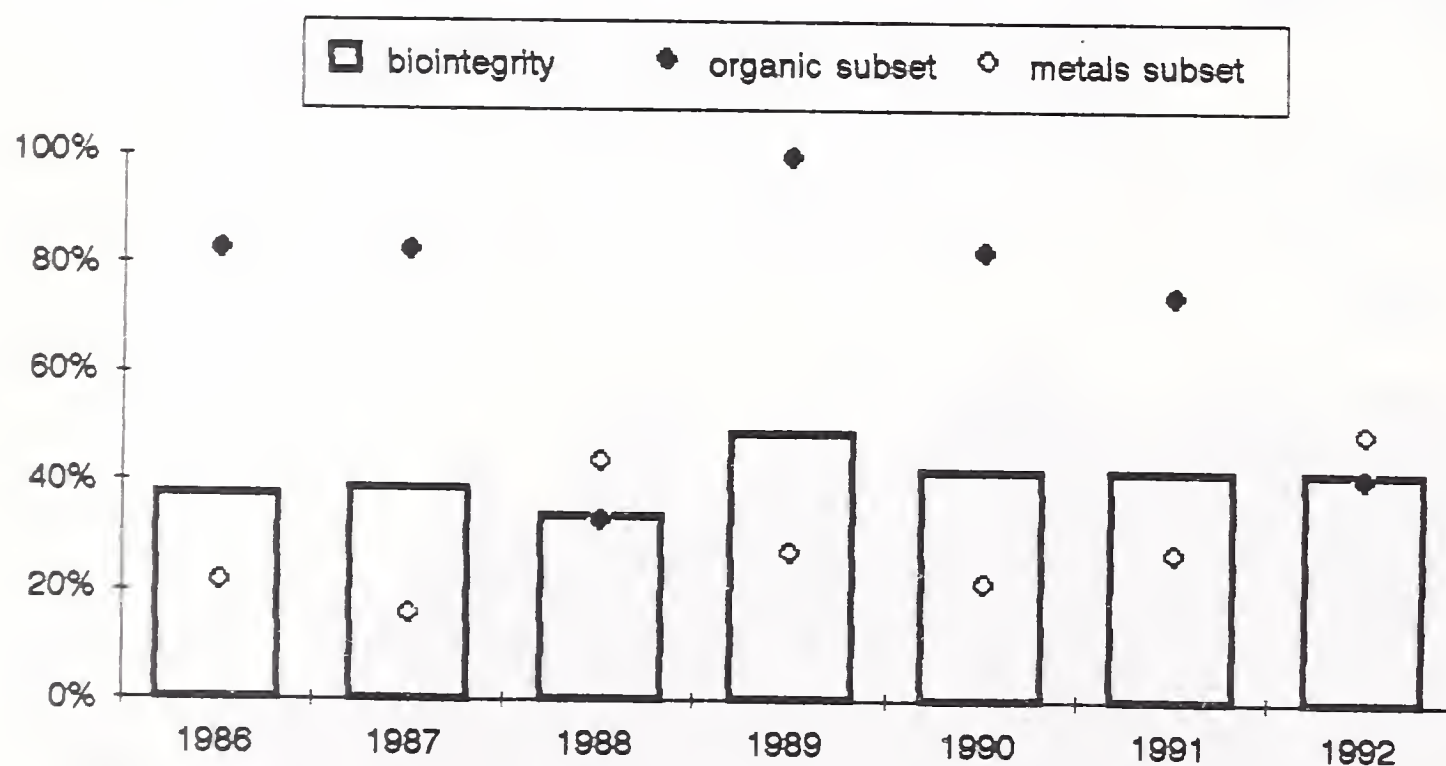


Figure 8. Biointegrity (%) in Silver Bow Creek below the Warm Springs ponds: station 04, 1986 to 1991.

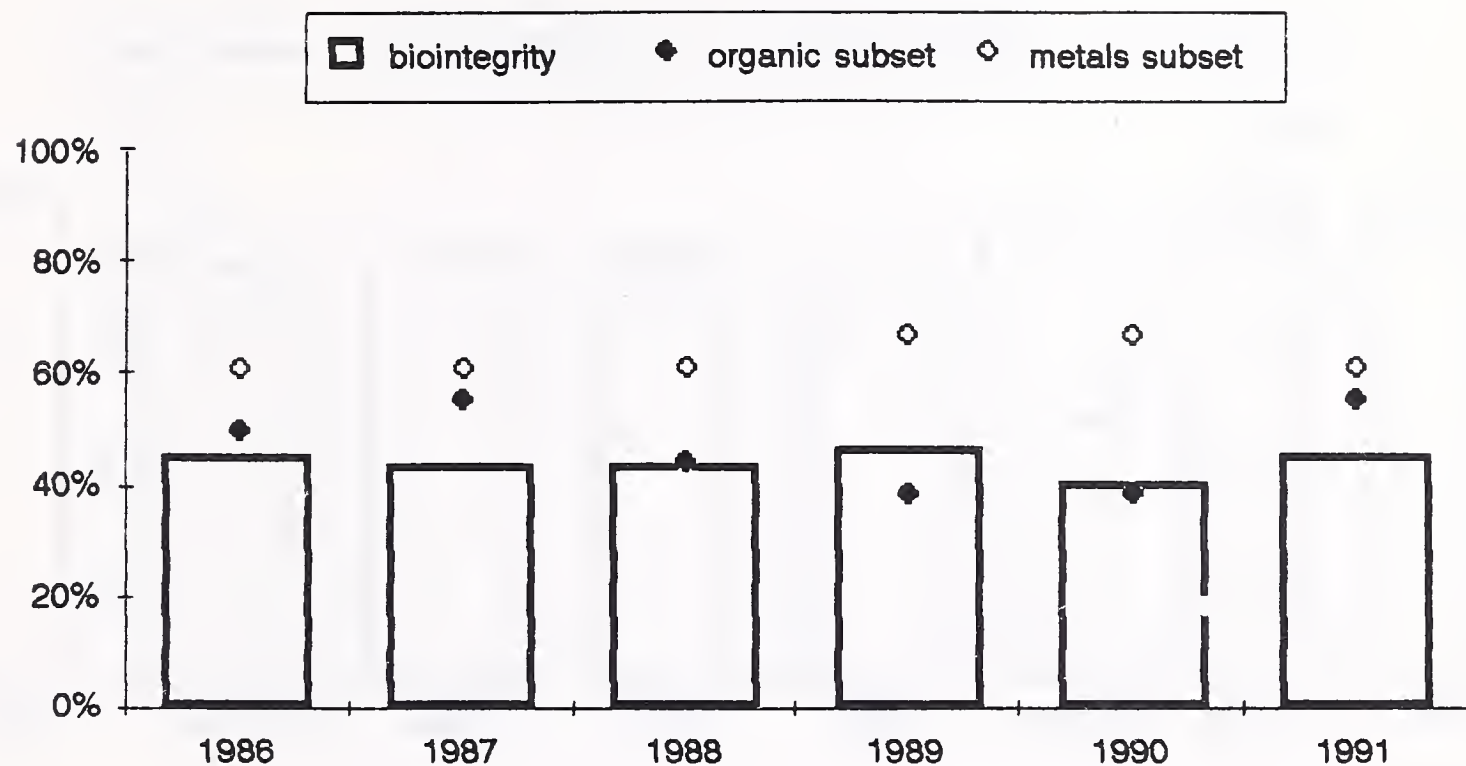


Figure 9. Biointegrity (%) in the Mill-Willow creeks bypass: station 05, 1986 to 1991.

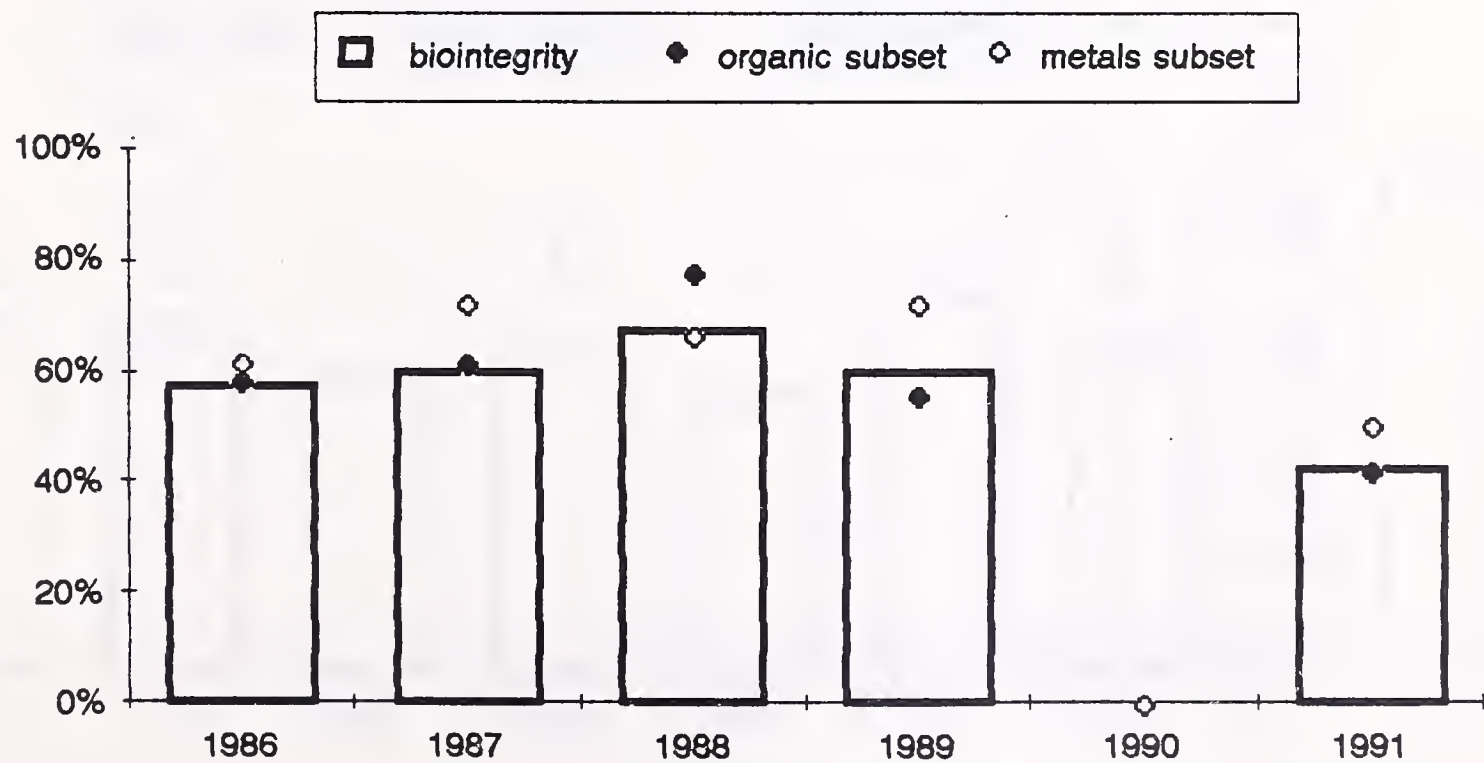


Figure 10. Biointegrity (%) in Warm Springs Creek: station 06, 1986 to 1991.

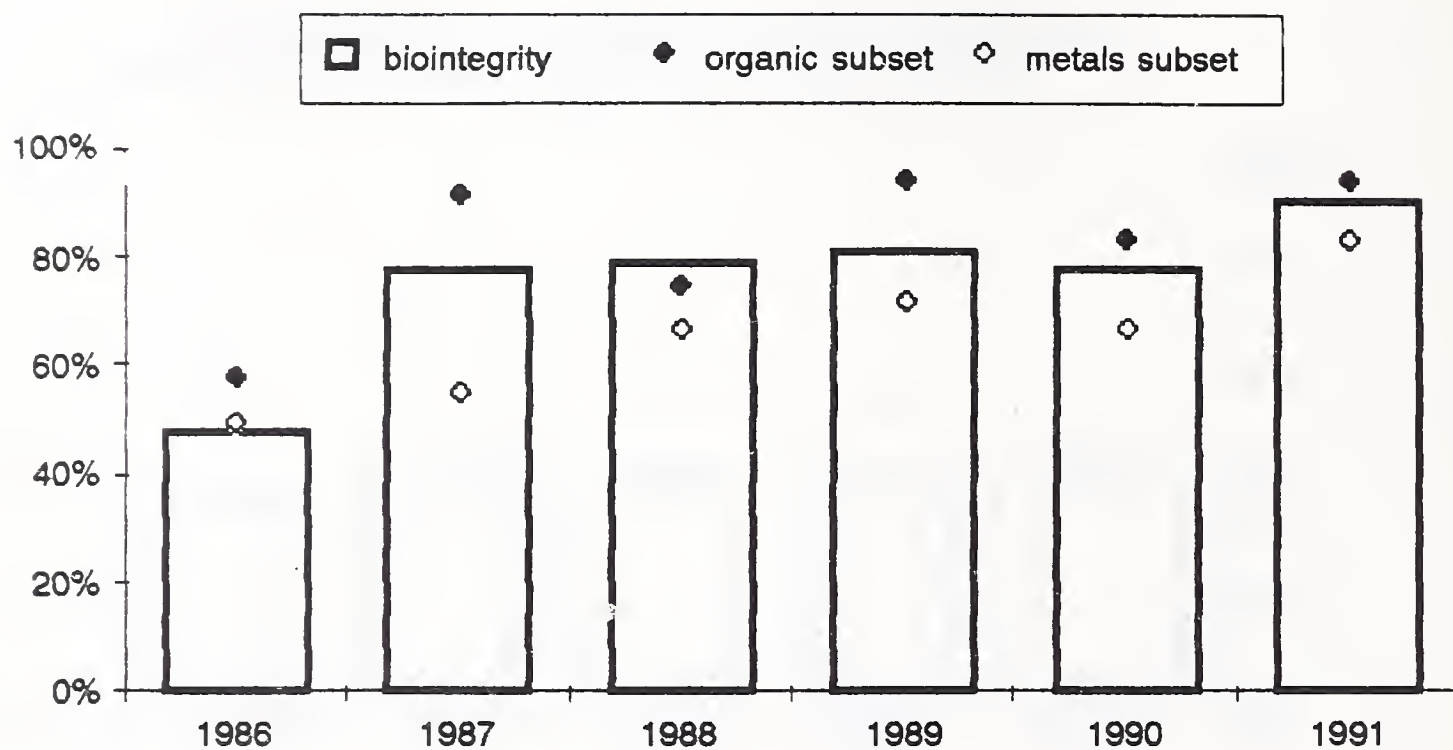


Figure 11. Biointegrity (%) in the Clark Fork River below Warm Springs Creek: station 07, 1986 to 1992.

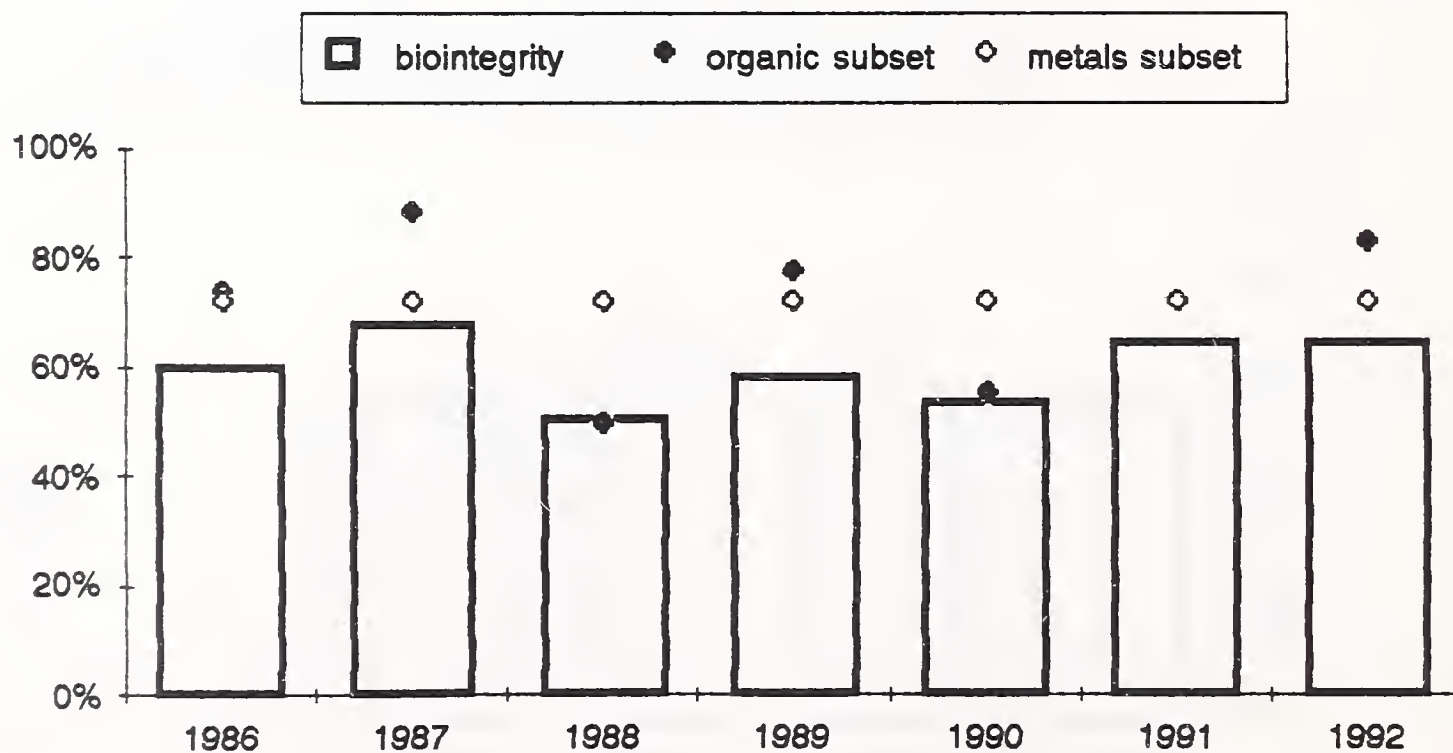


Figure 12. Biointegrity (%) in the Clark Fork River near Dempsey: station 08, 1986 to 1992.

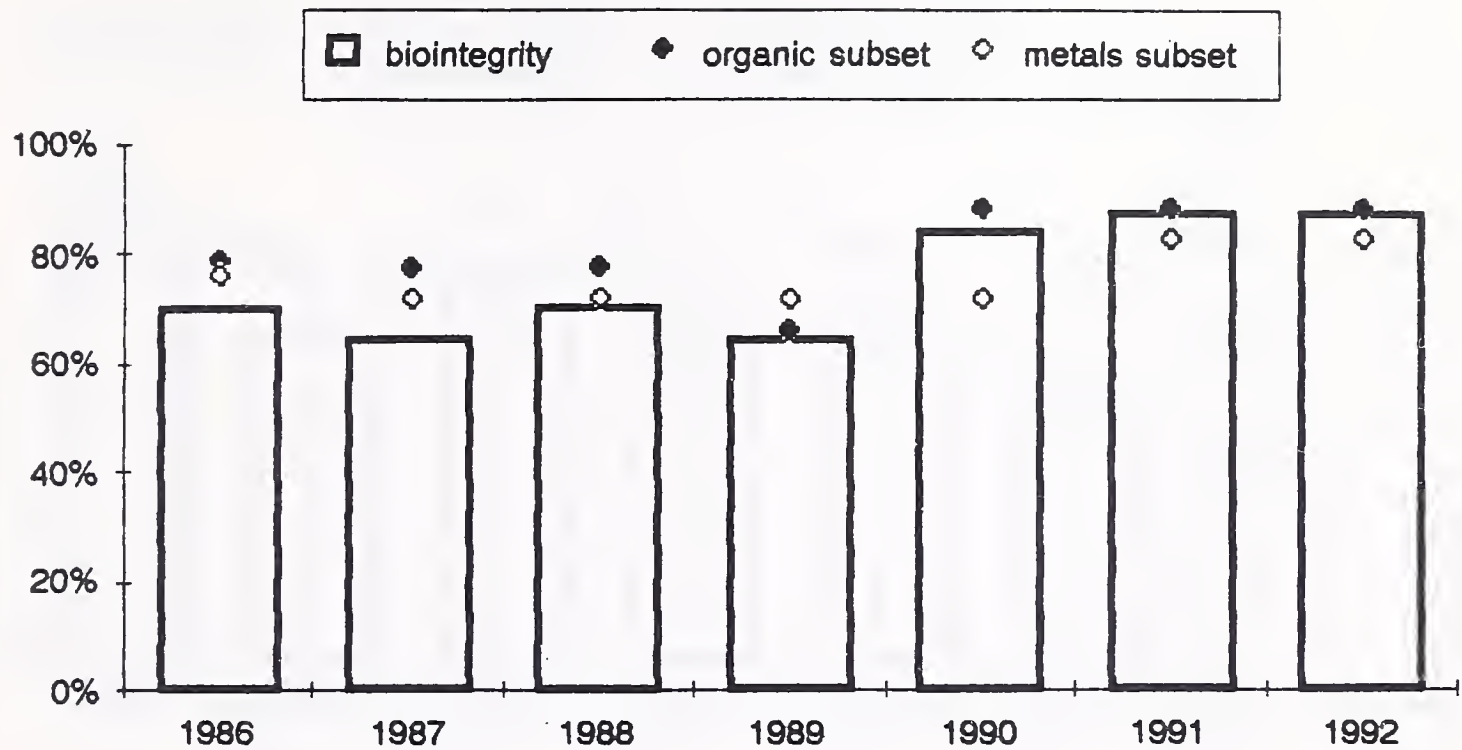


Figure 13. Biointegrity (%) in the Clark Fork River at Sager Lane: station 08.5, 1990 to 1992.

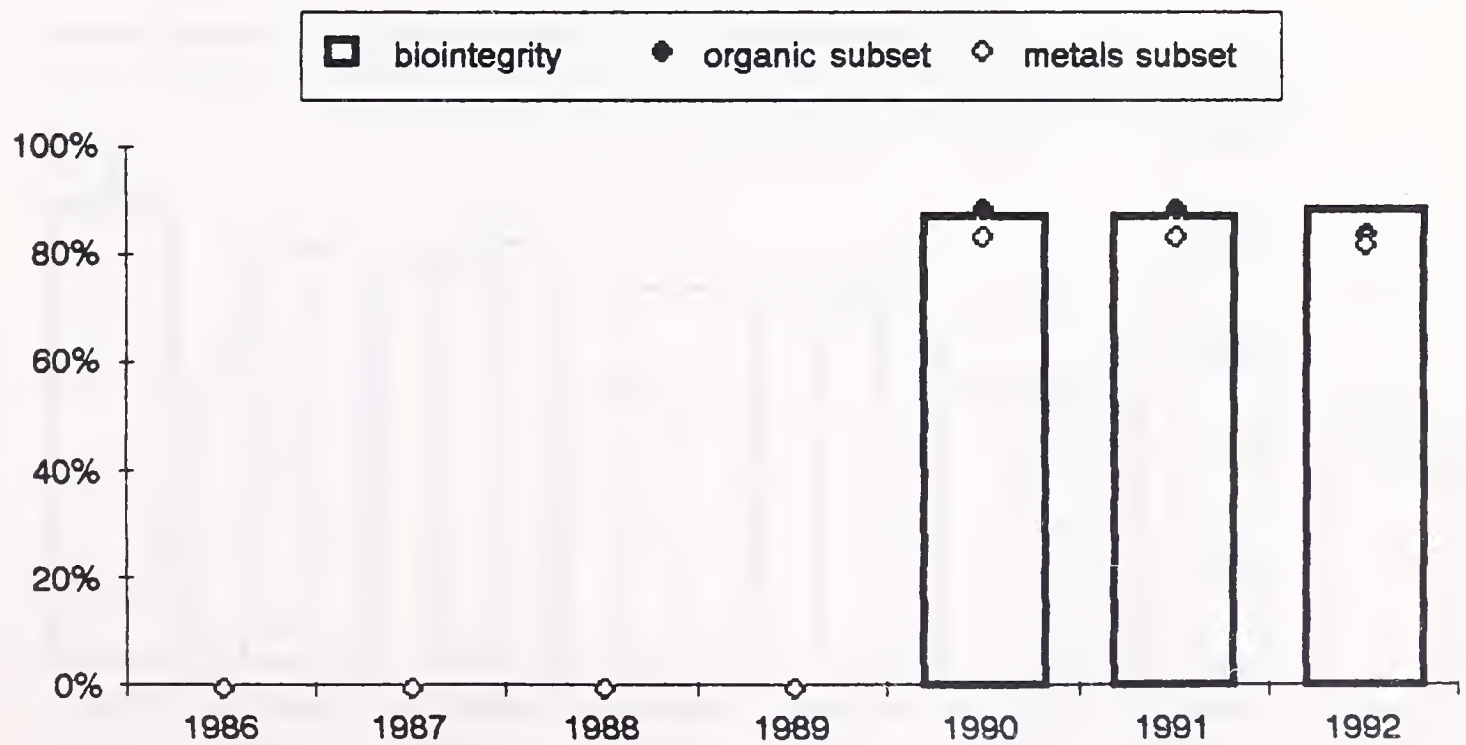


Figure 14. Biointegrity (%) in the Clark Fork River at Deer Lodge: station 09, 1986 to 1992.

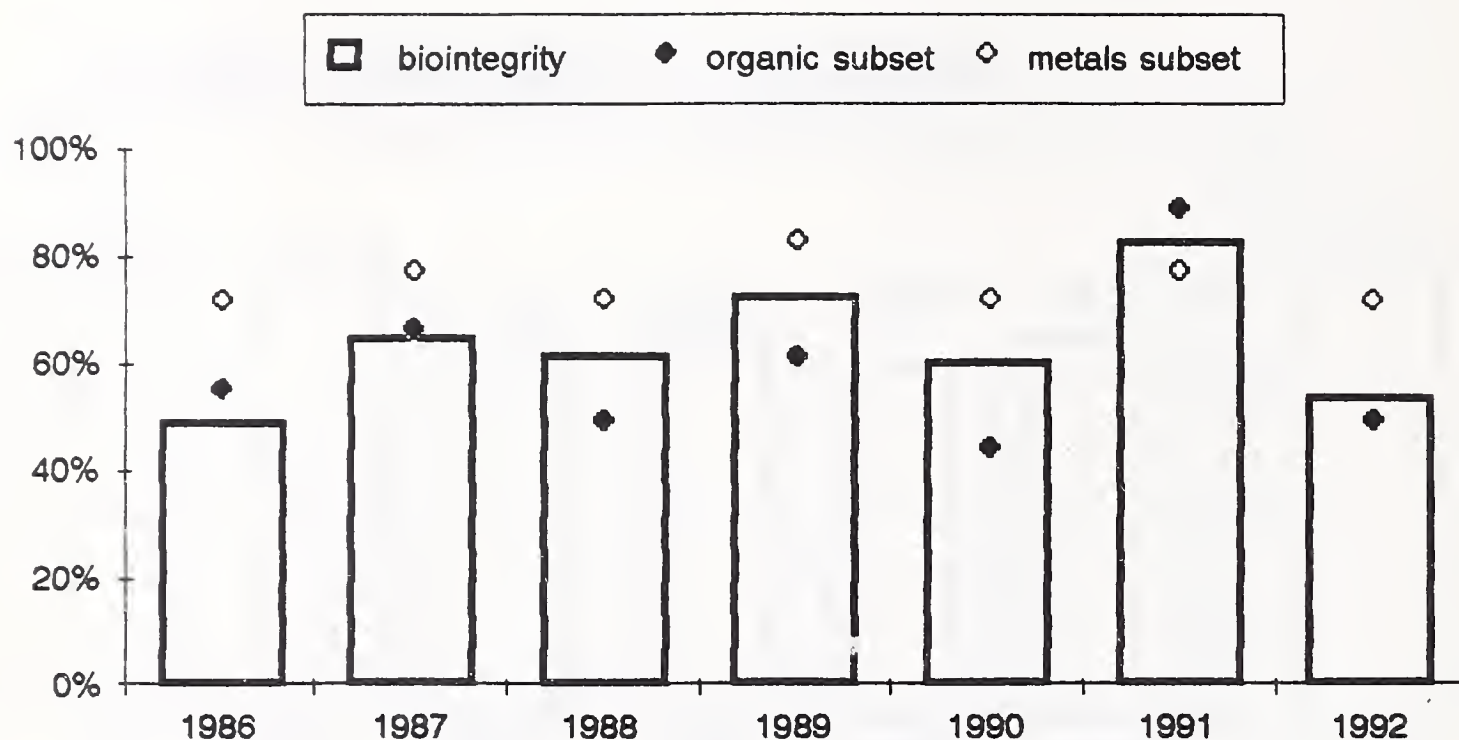
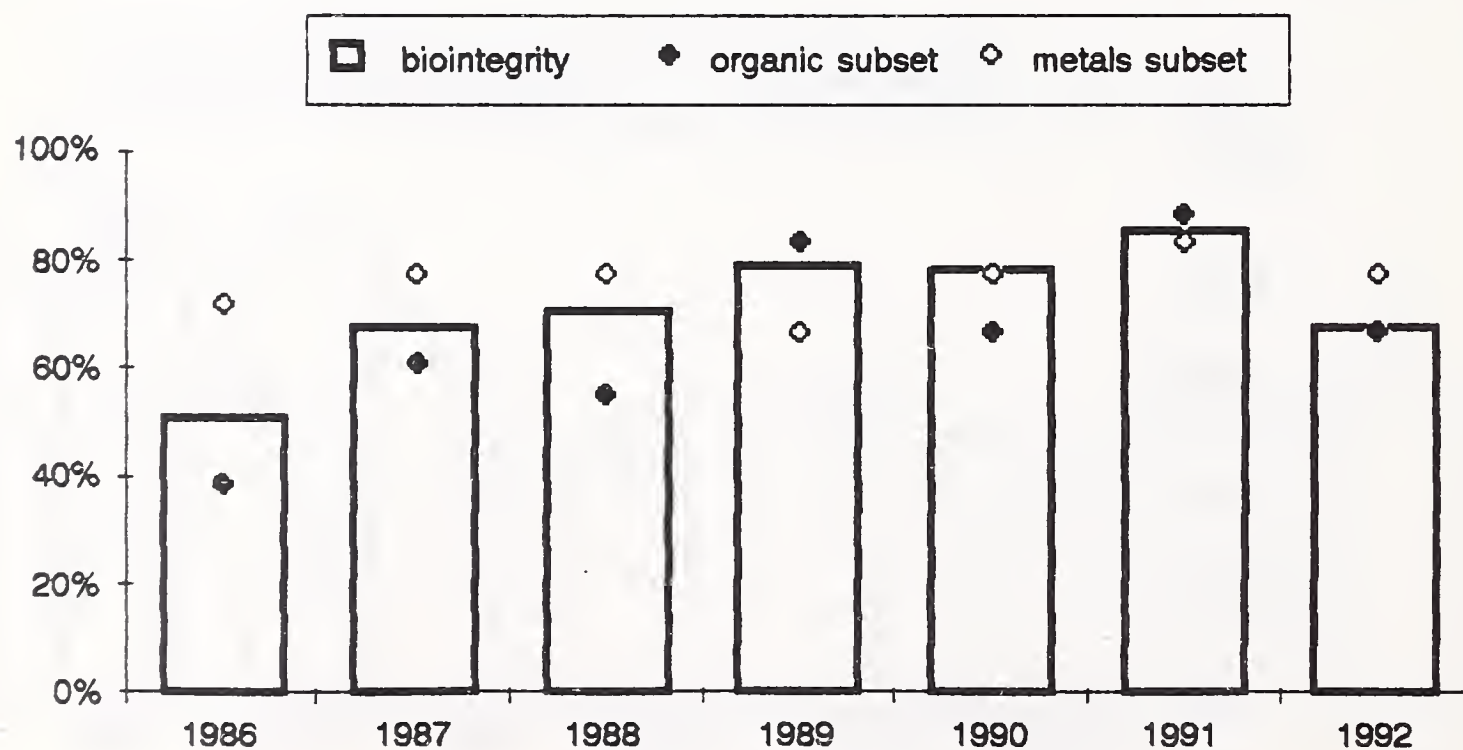
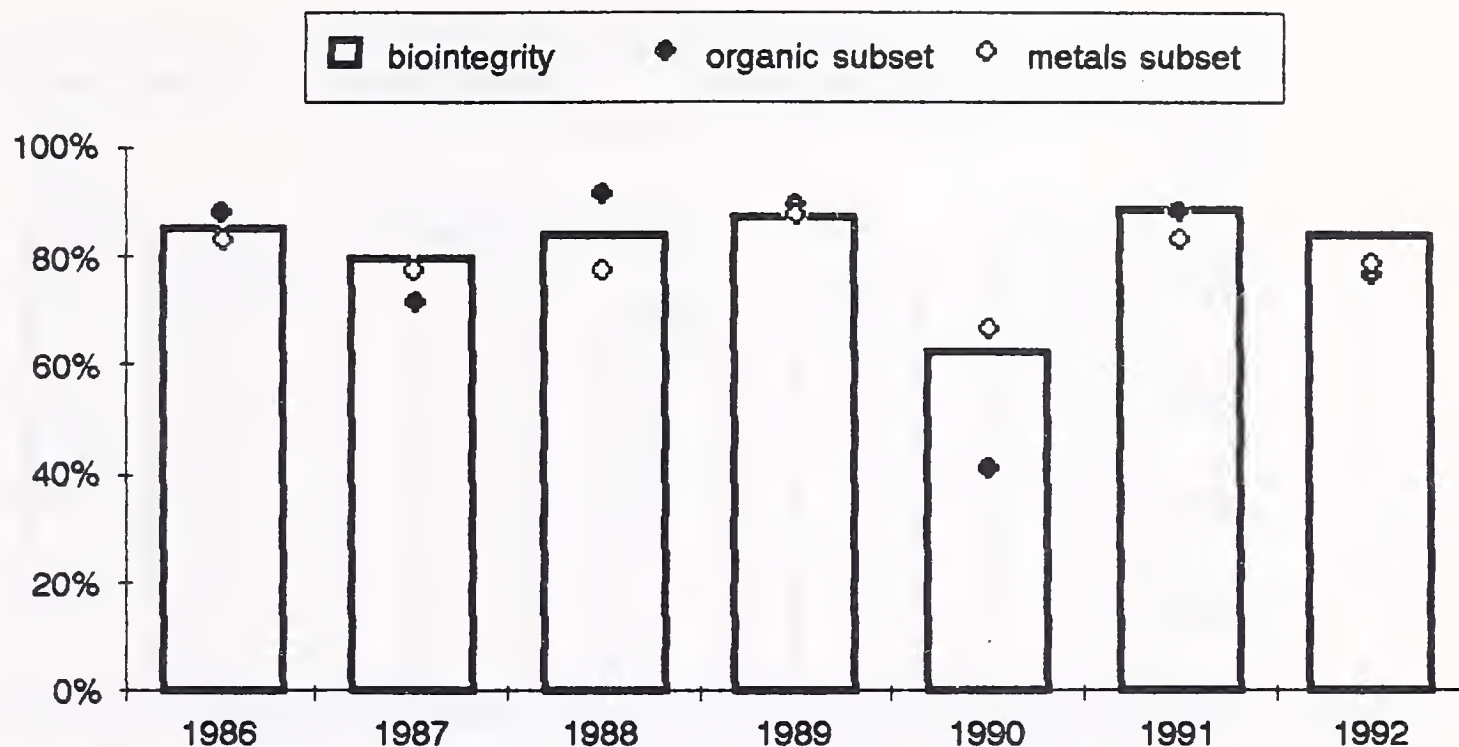


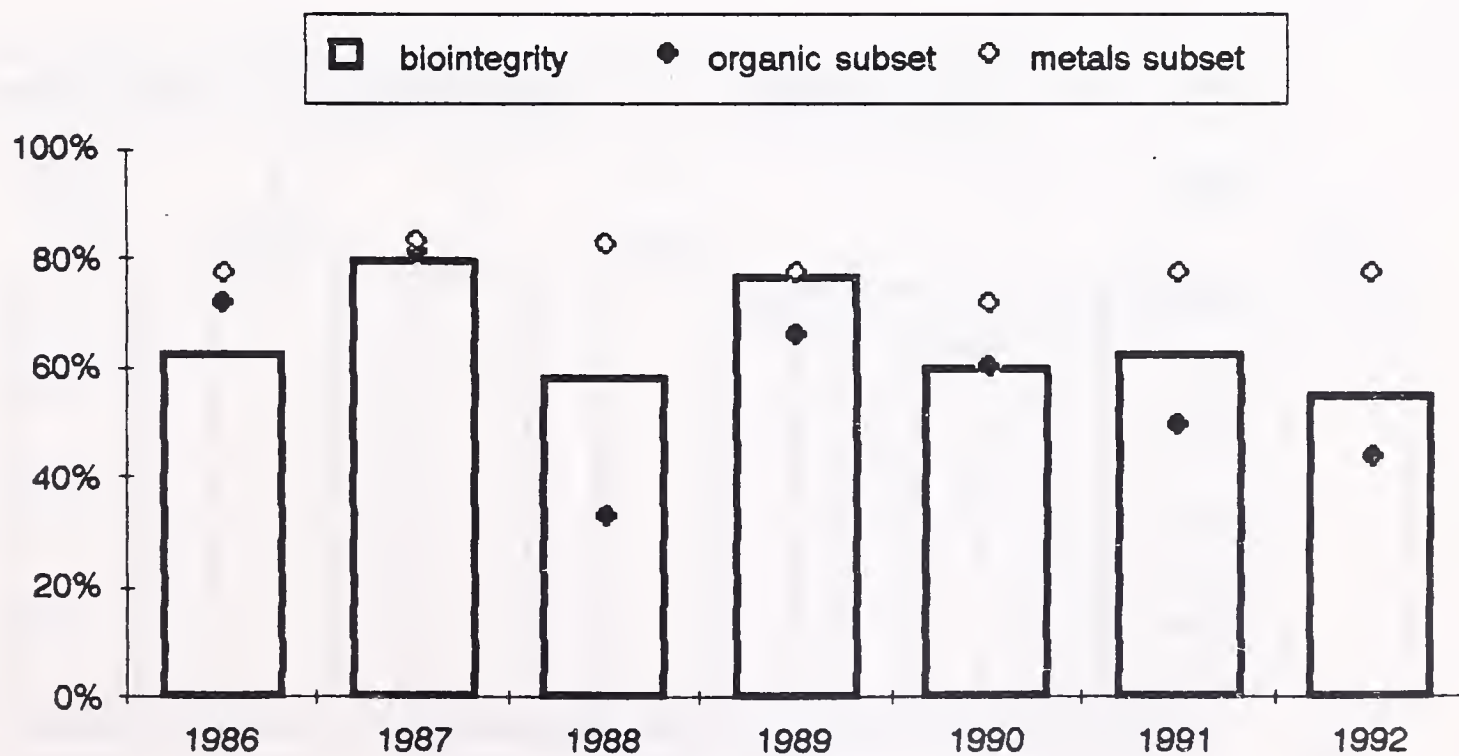
Figure 15. Biointegrity (%) in the Clark Fork River above the Little Blackfoot River station 10, 1986 to 1992.



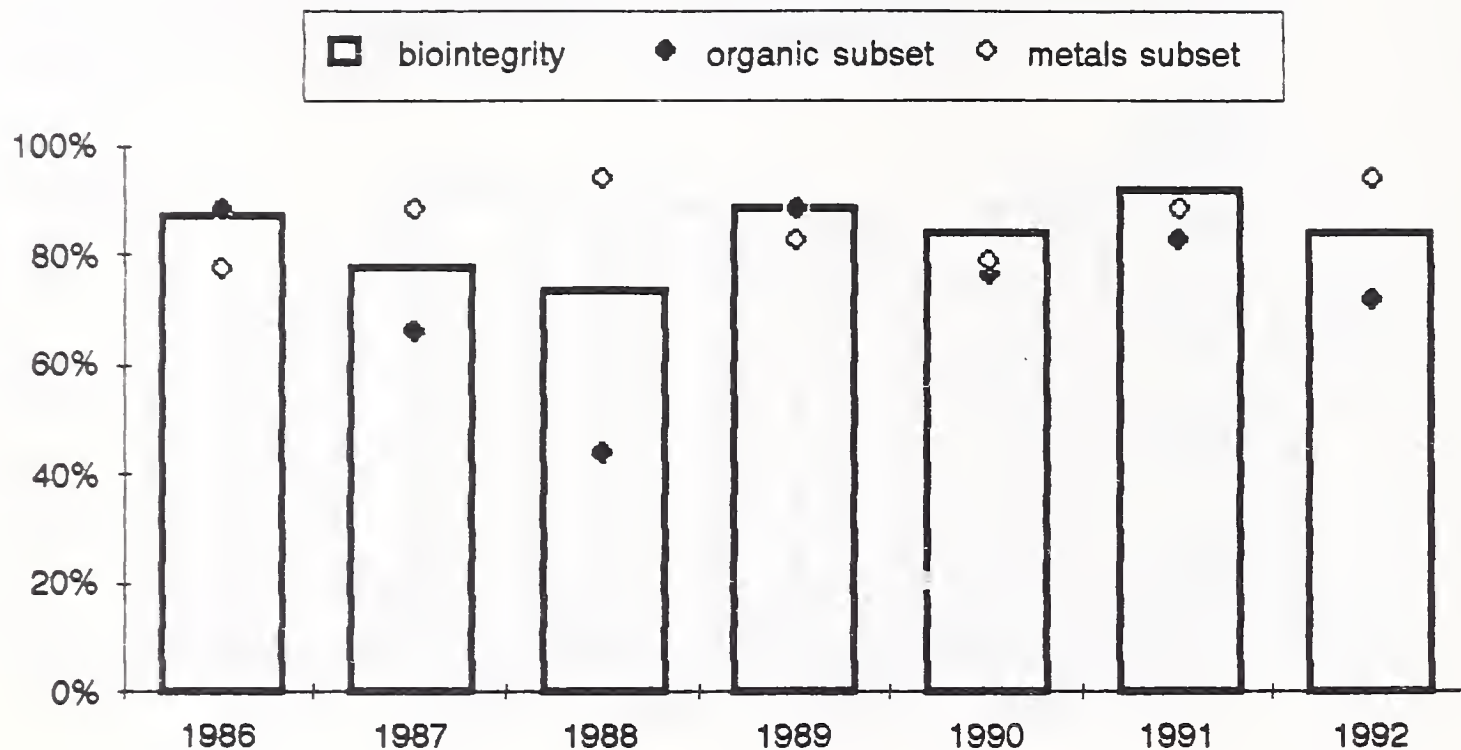
**Figure 16. Biointegrity (%) in the Clark Fork River at Gold Creek
Bridge: station 11, 1986 to 1992.**



**Figure 17. Biointegrity (%) in the Clark Fork River at Bonita:
station 12, 1986 to 1992.**



**Figure 18. Biointegrity (%) in the Clark Fork River at Turah:
station 13, 1986 to 1992.**



**Figure 19. Biointegrity (%) in the Blackfoot River near mouth:
station 14, 1986 to 1992.**

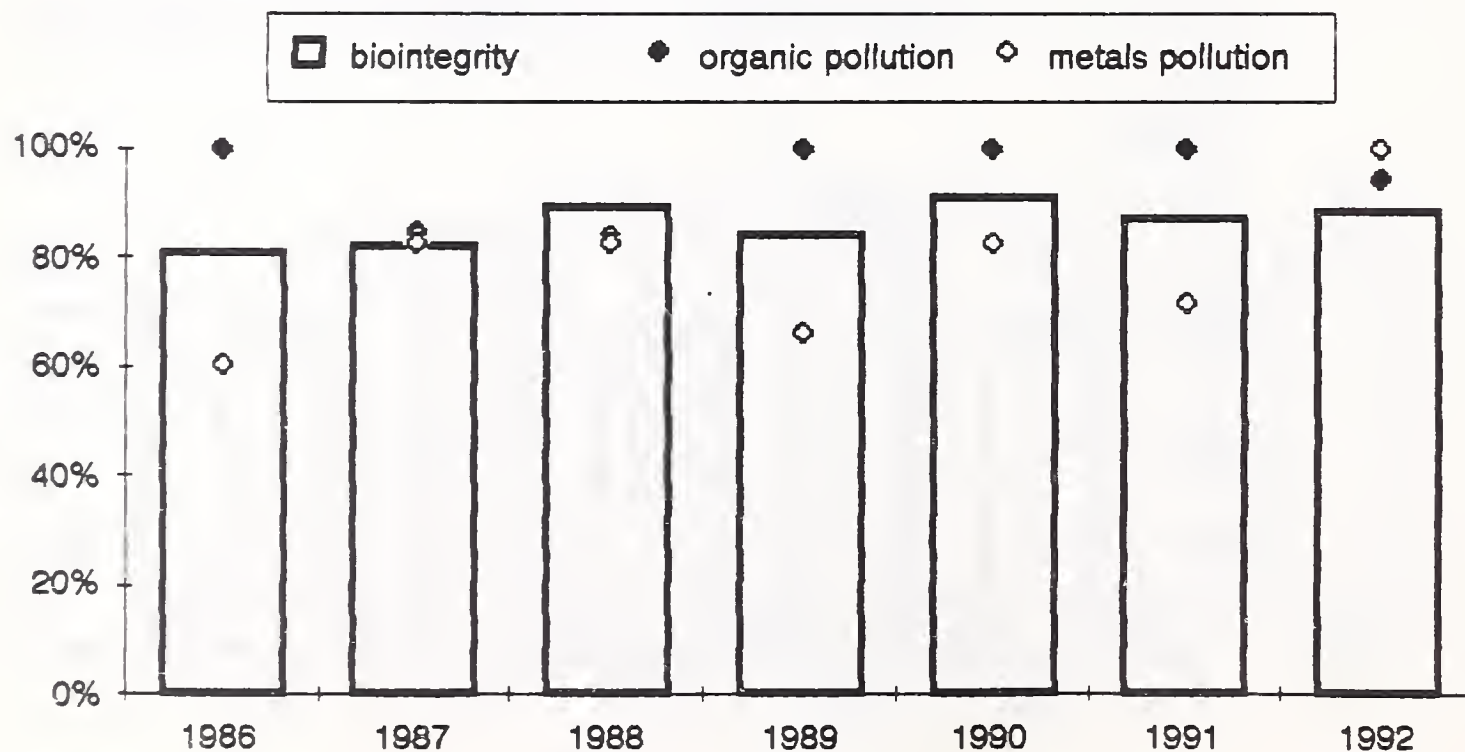


Figure 20. Biointegrity (%) in the Clark Fork River below Milltown Dam: station 15, 1986 to 1988.

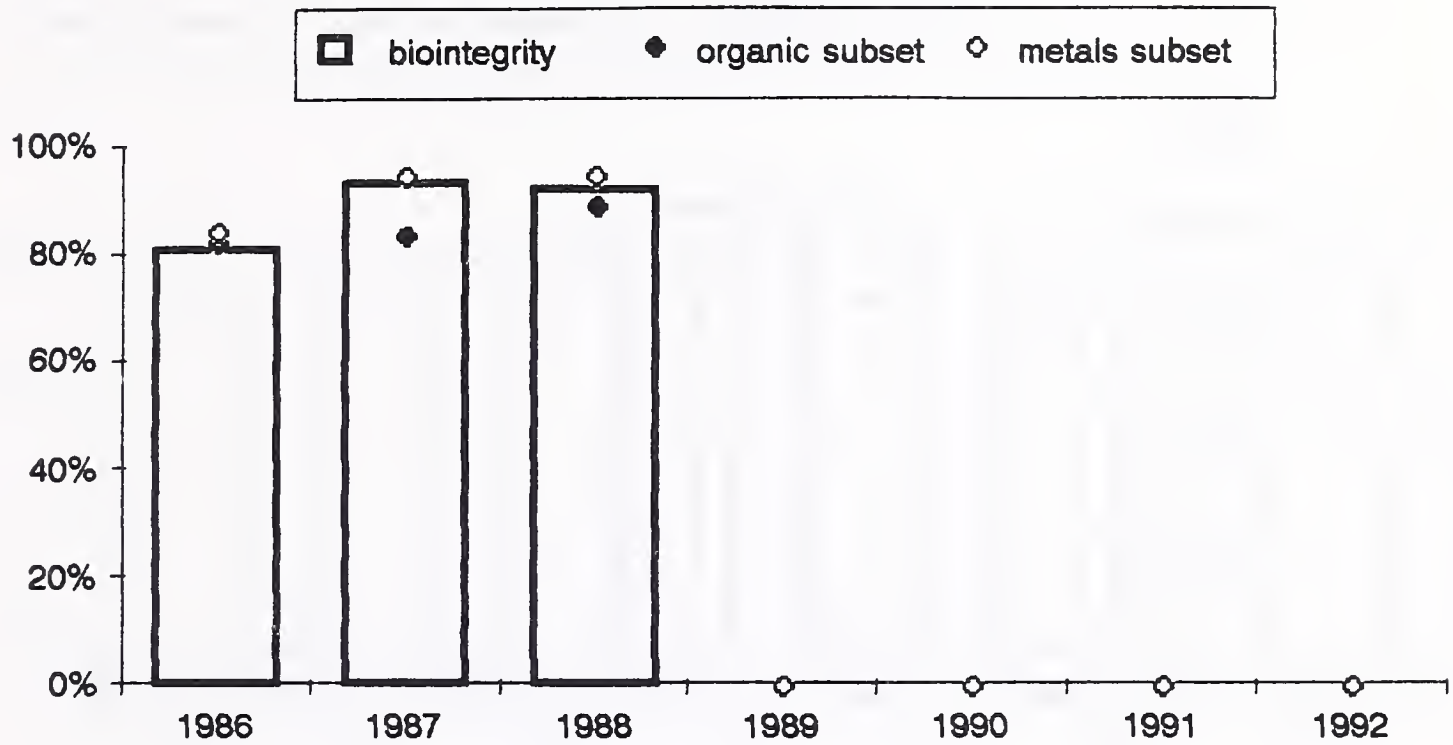


Figure 21. Biointegrity (%) in the Clark Fork River near the Missoula city limits: station 15.5, 1989 to 1992.

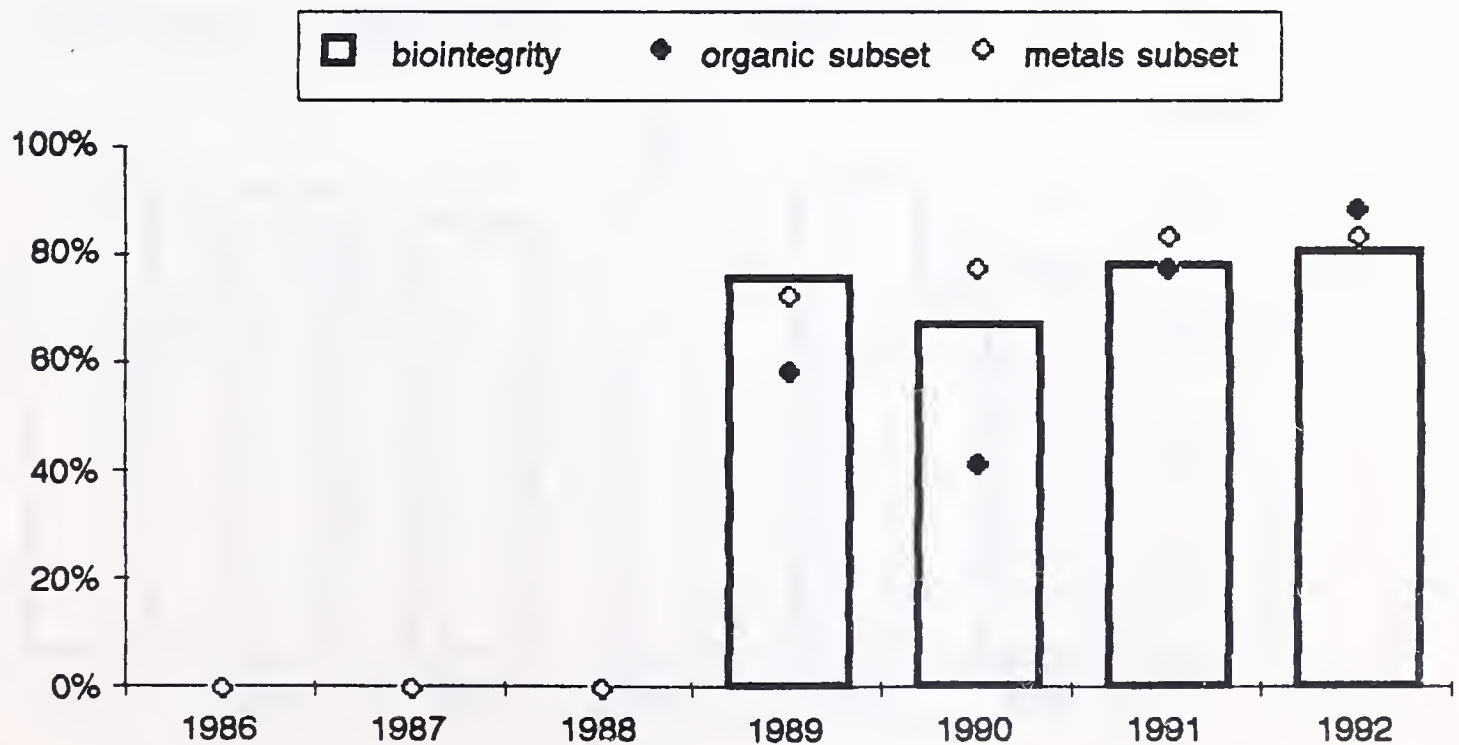


Figure 22. Biointegrity (%) in the Clark Fork River above the Missoula WWTP: station 16, 1986 to 1988.

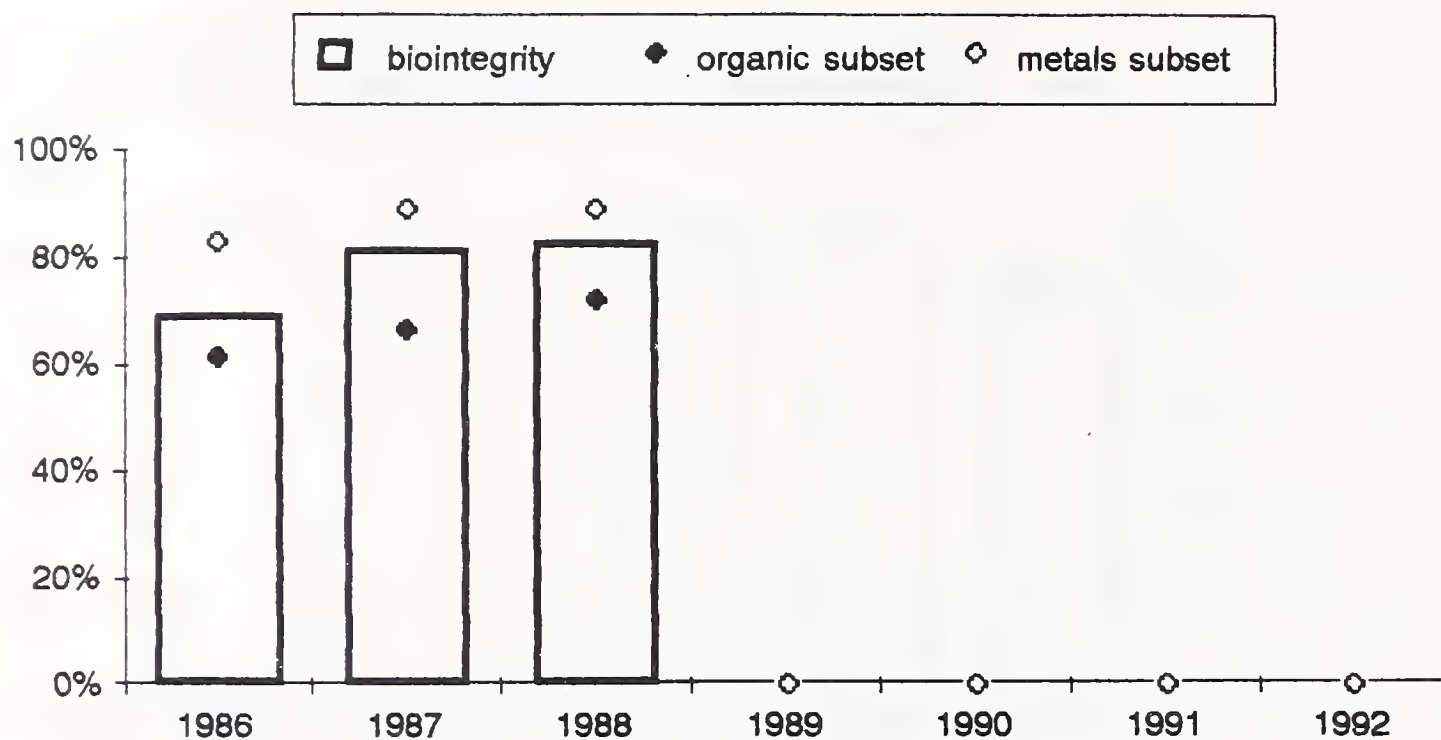
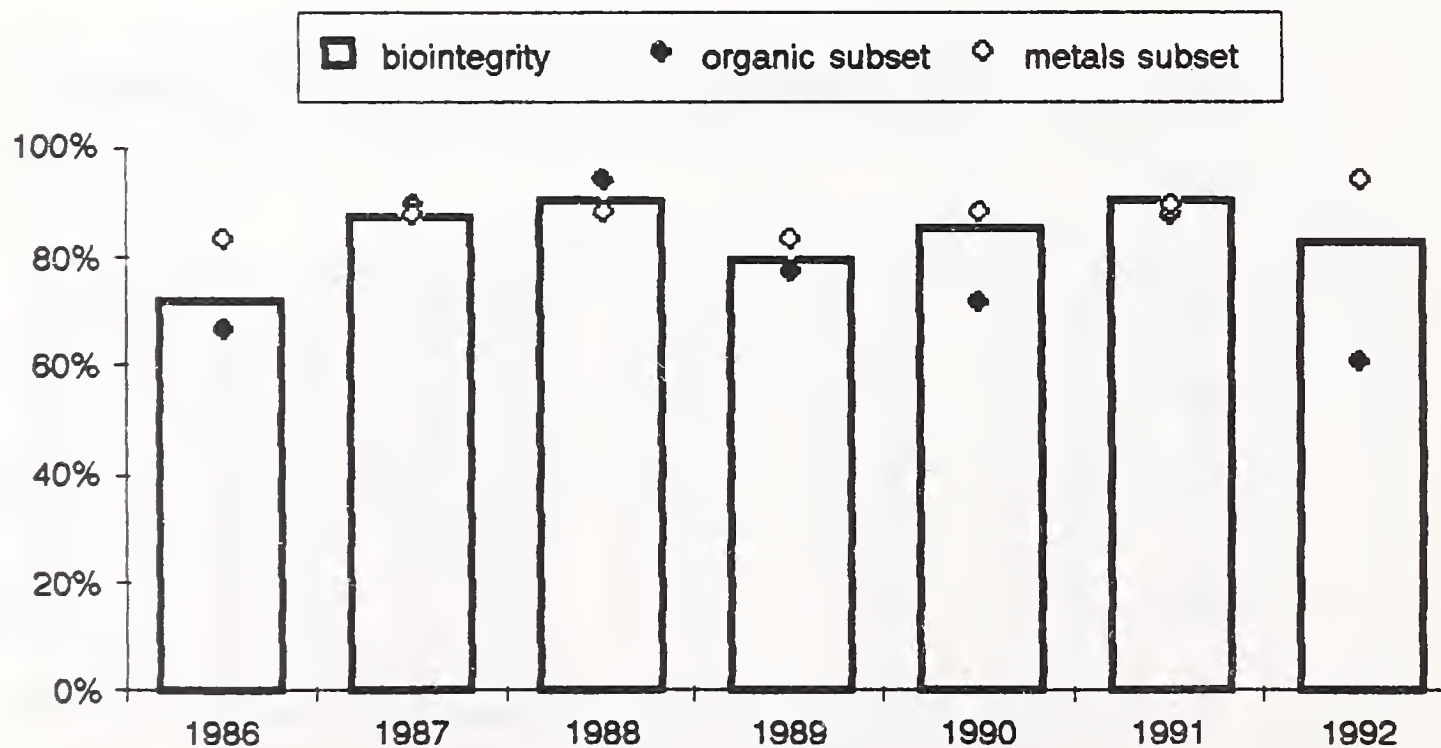
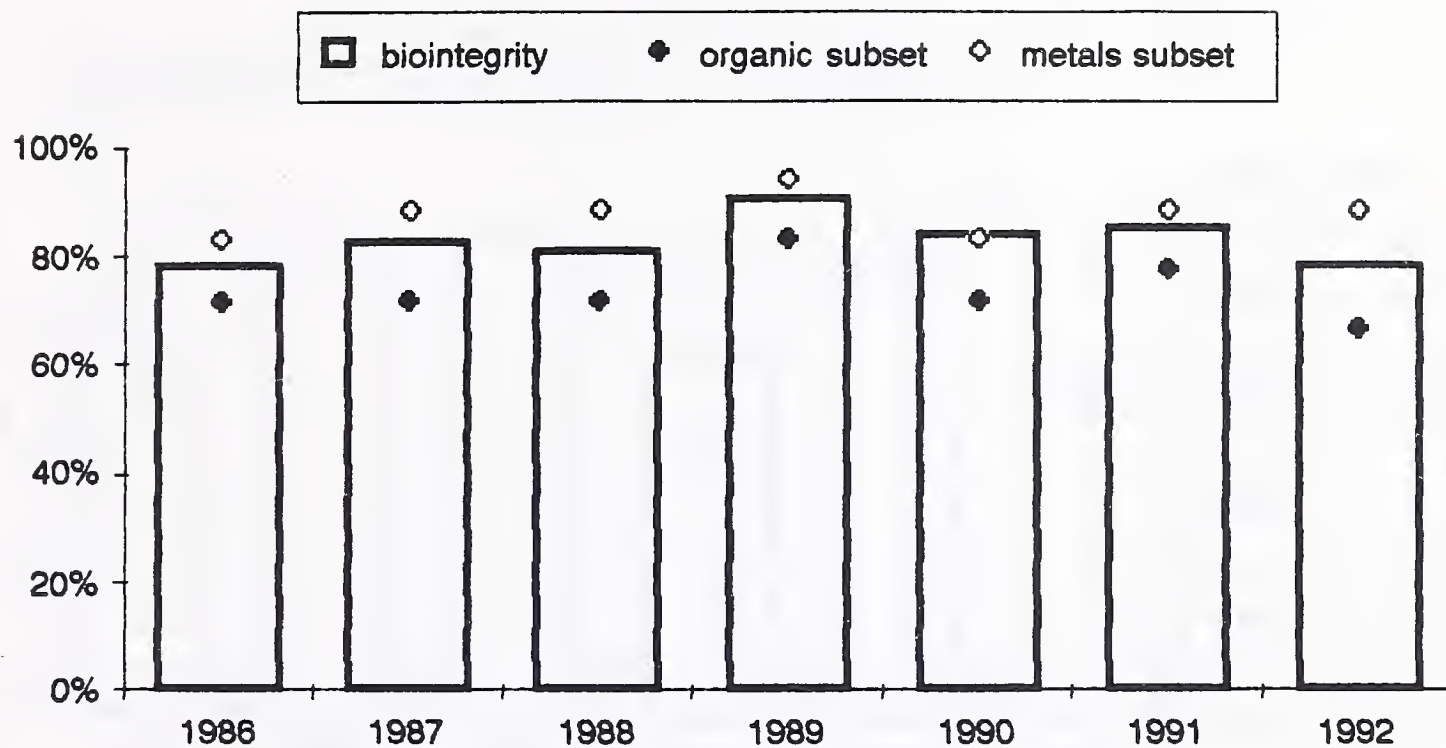


Figure 23. Biointegrity (%) in the Clark Fork River at Shuffield's: station 18, 1986 to 1992.



**Figure 24. Biointegrity (%) in the Bitterroot River near mouth:
station 19, 1986 to 1992.**



**Figure 25. Biointegrity (%) in the Clark Fork River at Harper Bridge:
station 20, 1986 to 1992.**

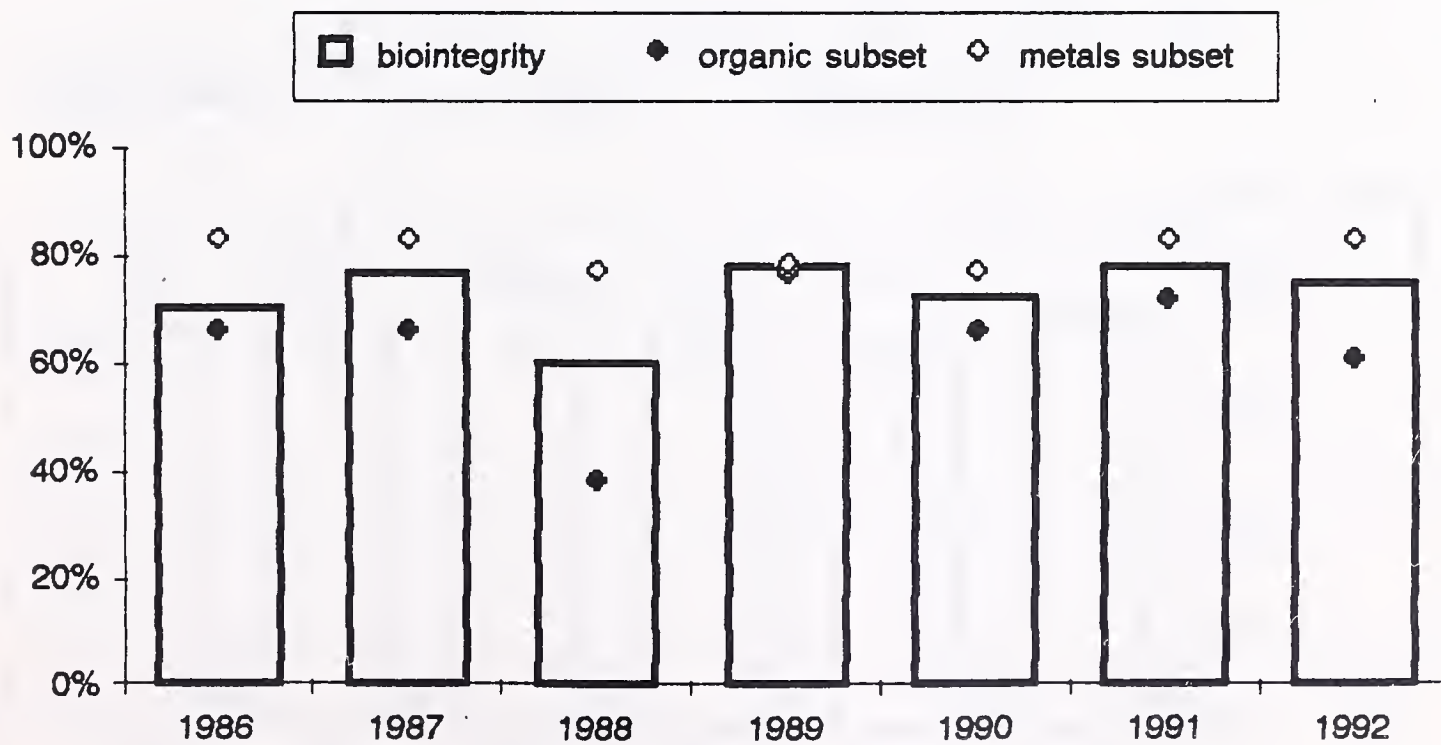


Figure 26. Biointegrity (%) in the Clark Fork River at Huson: station 22, 1986 to 1992.

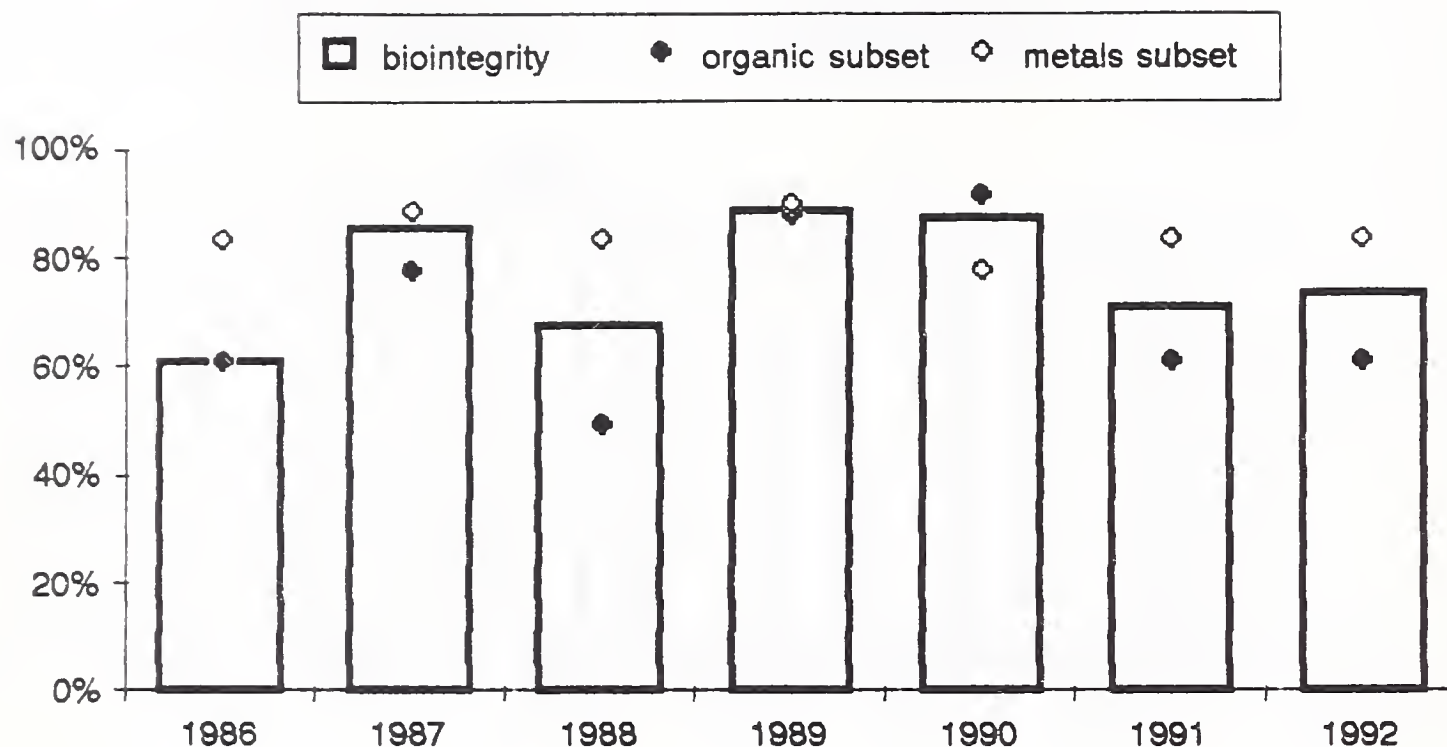


Figure 27. Biointegrity (%) in the Clark Fork River near Alberton: station 23, 1986 to 1992.

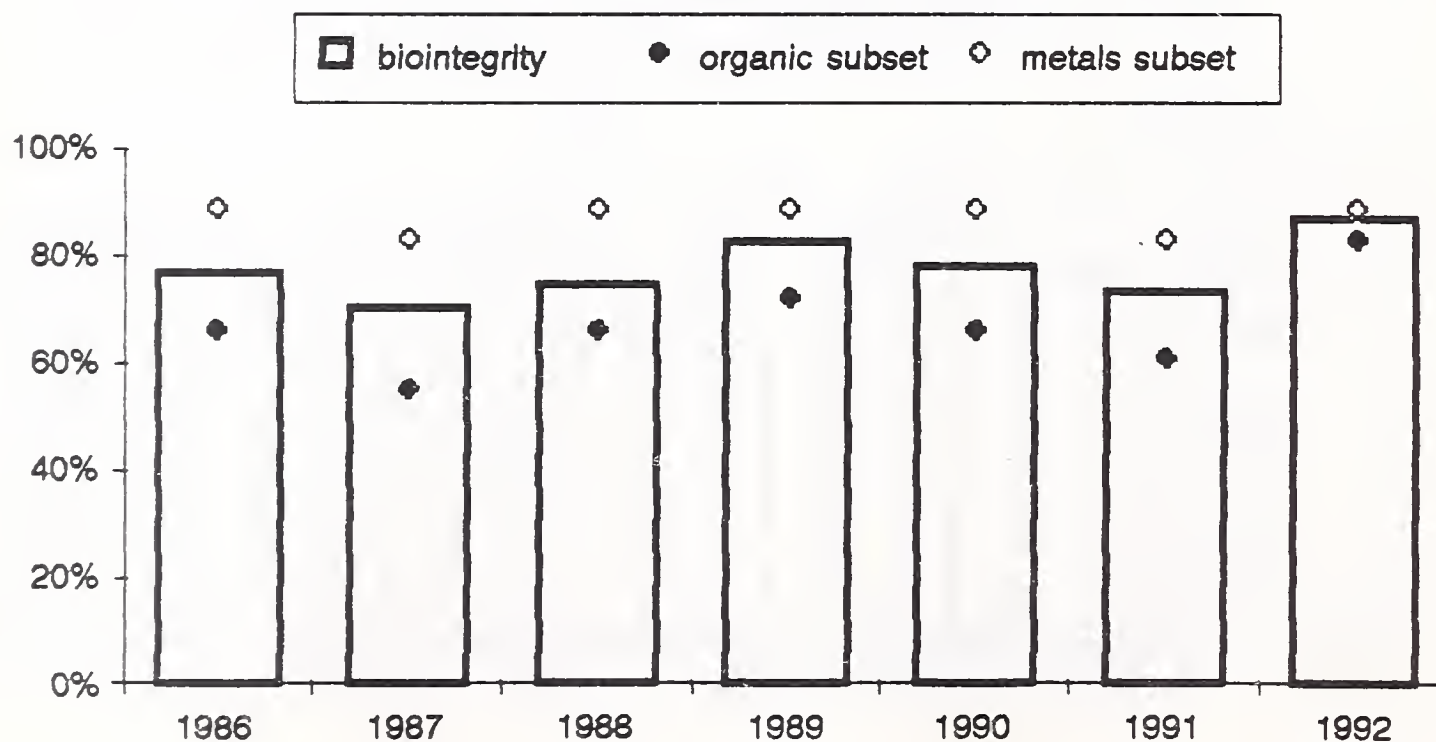


Figure 28. Biointegrity (%) in the Clark Fork River at Superior: station 24, 1986 to 1992.

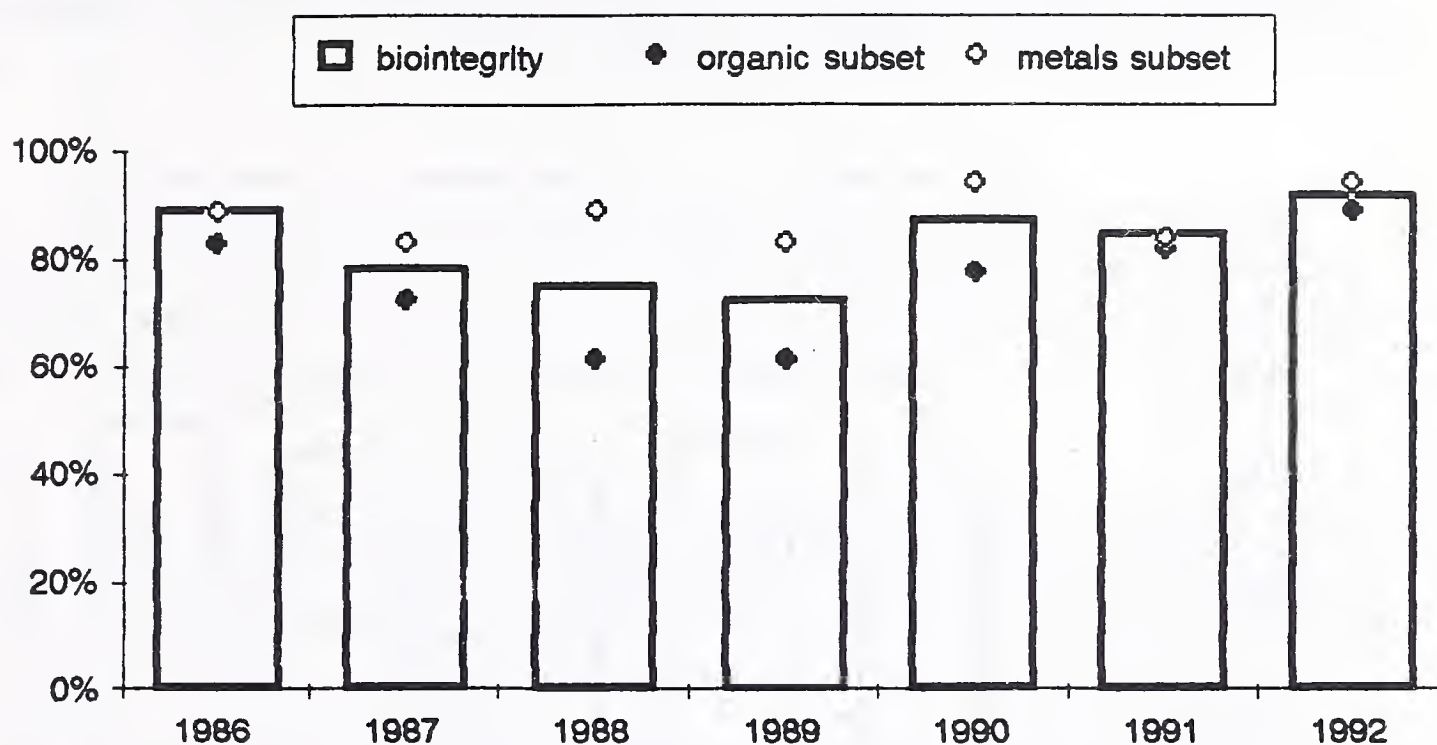


Figure 29. Biointegrity (%) in the Clark Fork River above the Flathead River: station 25, 1986 to 1992.

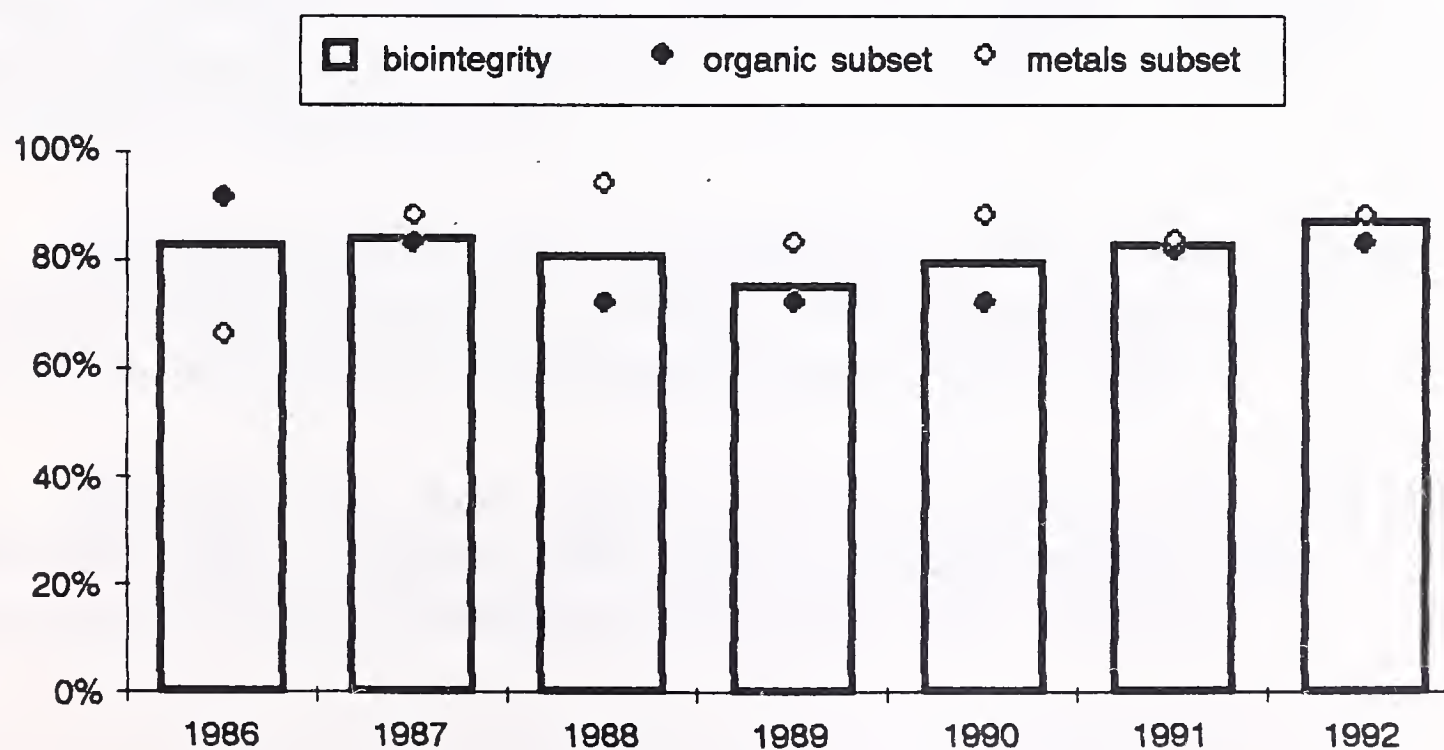
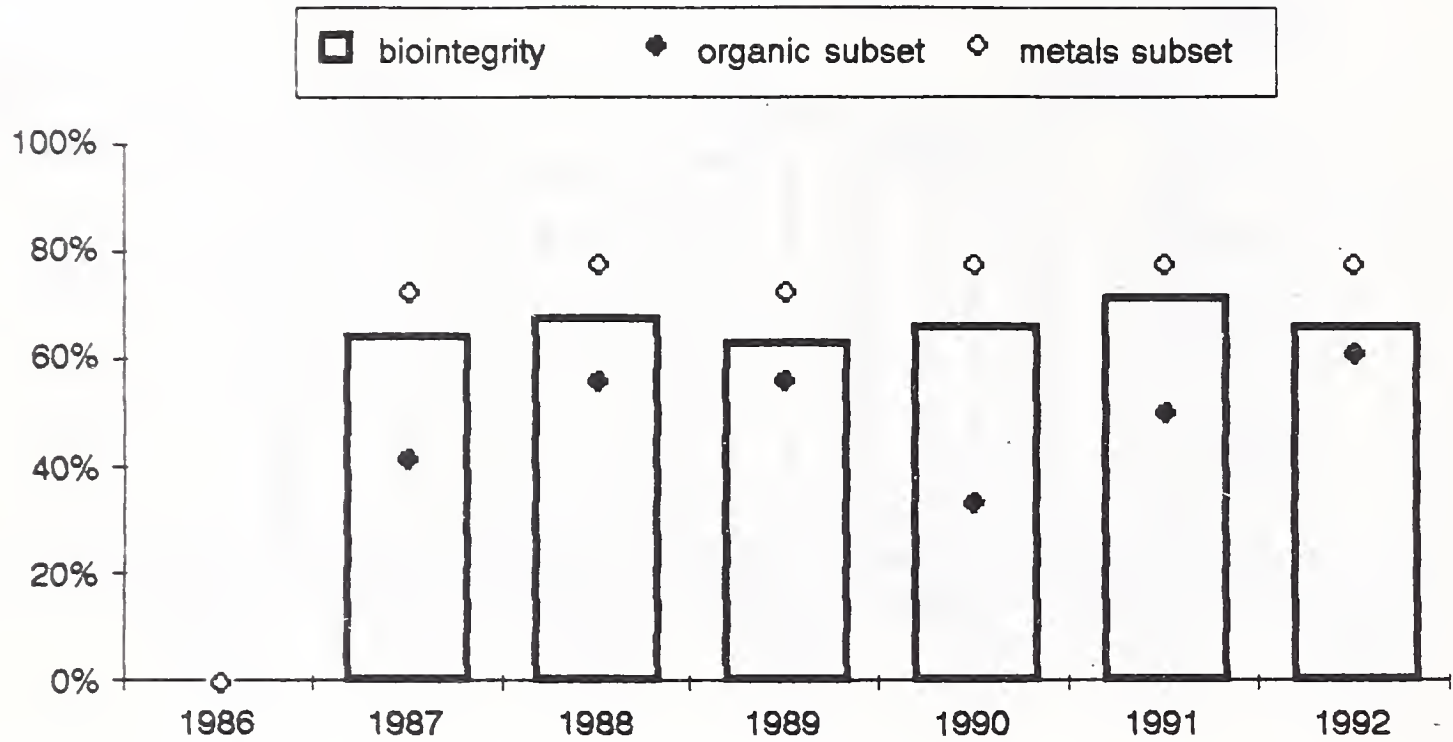


Figure 30. Biointegrity (%) in the Clark Fork River above Thompson Falls Reservoir: station 27, 1987 to 1992.



5. CONCLUSIONS

1. The composition and structure of macroinvertebrate assemblages reflected a wide range of environmental conditions and water quality in the 300 miles of the Clark Fork River drainage that were surveyed.
2. For the study area as a whole, there was a significant trend of increasing biointegrity from 1986 to 1992. Weak positive trends were indicated at 20 of 24 stations; however, year-to-year variability precluded statistical significance at all but one of those stations.
3. Silver Bow Creek was severely polluted by metals, nutrients and organic pollutants throughout the seven-year monitoring period. Metals toxicity depressed biological integrity and restricted the benthic fauna to a few tolerant species. Biological responses to nutrient and organic enrichment were usually limited in the prevailing toxic environment. When metals impacts diminished, organic pollution prevented significant improvement in biointegrity.
4. The Warm Springs Ponds greatly reduced the severity of metals pollution in Silver Bow Creek. However, as toxicity was reduced, biological responses to organic enrichment became apparent. Biological integrity, although slightly higher than above the ponds, was severely depressed by organic pollution.
5. Biological integrity improved significantly in Warm Springs Creek during the monitoring period and, despite partial dewatering, macroinvertebrate biointegrity was nonimpaired during 1991 and 1992.
6. Biointegrity was much higher in the upper Clark Fork River than in Silver Bow Creek. However, both metals and organic pollution were apparent and reduced biointegrity in the upper Clark Fork River.

7. Metals pollution in the Clark Fork River was most severe in the headwaters; however, significant impacts were evident downstream as far as Bonita. Below the confluence of Rock Creek, metals-related impacts were minimal to non-detectable.
8. Organic/nutrient pollution was evident at all sites on the Clark Fork mainstem. The most deleterious impacts were in the upper river, from Deer Lodge to the confluence of the Little Blackfoot River and at Bonita. In the middle river, biointegrity was depressed as a result of organic and nutrient pollution from Harper Bridge to Alberton.
9. Impacts attributable to organic pollution were probably exacerbated by limited nutrient assimilation in upstream metal-polluted reaches.
10. Biointegrity in the Clark Fork River near Dempsey showed significant improvement during the last three years of monitoring. Since 1990, the river reach from Dempsey to Sager Lane has been among the least impaired in the study area.
11. The lower Blackfoot River was among the healthiest sites in the study area. This station was generally free from impacts attributable to organic, nutrient or metals pollution and biointegrity was near optimal.
12. Data from 1986 to 1992 provide a good baseline for evaluating future ecological conditions and trends of the Clark Fork River Basin. These data will be particularly useful in documenting the effectiveness of remedial actions in the upper basin.

6. LITERATURE CITED

- Averett, R. C. 1961. Macroinvertebrates of the Clark Fork River, Montana. Water Pollution Control Report No. 61-1. Montana State Board of Health and Montana State Fish and Game Dept.
- Bahls, L. L., R. Bukantis and S. Tralles. 1992. Benchmark biology of Montana reference streams. Montana Dept. Health and Environmental Sciences, Water Quality Bureau. Helena, MT.
- Canton, S. P. and J. W. Chadwick. 1985. The aquatic invertebrates of the upper Clark Fork River, 1972-1984. In: Carlson and Bahls (eds.). Proceedings of the Clark Fork River Symposium. Montana Tech. Butte.
- Clements, W. H. 1991. Community responses of stream organisms to heavy metals: a review of observational and experimental approaches. In: Newman M. and A. McIntosh (eds.). Metal Ecotoxicology: Concepts and Applications. Lewis Publishers.
- Clements, W. H., D. S. Cherry and J. Cairns. 1988. Impact of heavy metals on insect communities in streams: a comparison of observational and experimental results. Can. J. Aquat. Sci. 45:2017-2025.
- Chadwick, J. W., S. P. Canton, and R. L. Dent. 1986. Recovery of benthic communities in Silver Bow Creek, Montana, following improved metal mine wastewater treatment. Water, Air, and Soil Pollution. 28:427-438.
- E. A. Engineering. 1991. Macroinvertebrate sampling in the Clark Fork River and Silver Bow Creek, Montana - 1988 and 1989.
- Harris, T.L. and T. M. Lawrence. 1978. Environmental requirements and pollution tolerance of Trichoptera. EPA-600/4-78-063. United States Environmental Protection Agency.
- Hilsenhoff, W. L. 1987. An improved biotic index of organic stream pollution. Great Lakes Entomologist. 20:31-39.

- Hubbard, M.D. and W.L. Peters. 1978. Environmental requirements and pollution tolerance of Ephemeroptera. EPA-600/4-78-061. United States Environmental Protection Agency.
- Ingman G. L. (ed.). 1985. Champion International Frenchtown Mill Discharge Permit, Vol. II. Montana Dept. of Health and Environmental Sciences. Mt-0000035.
- Ingman, G. L. and M. A. Kerr. 1990. Water Quality in the Clark Fork River Basin, Montana: State fiscal years 1988-1989. Final report. Montana Dept. of Health and Environmental Sciences, Water Quality Bureau.
- Ingman, G. L., M. A. Kerr and D. L. McGuire. 1990. Water Quality investigations in the Blackfoot River drainage, Montana. Final report. Montana Dept. of Health and Environmental Sciences, Water Quality Bureau.
- Janik, J. J. and S. M. Melancon. 1982. Site specific water quality assessment: Silver Bow Creek and Clark Fork River, MT. Unpublished manuscript. U. S. Environmental Protection Agency. EPA 600/X- 83-013.
- Kerr, M. A. 1988. Three before and after studies: the effects of upgrading the Hot Springs, Lewistown and Hamilton Wastewater treatment facilities on water quality. Mont. Dept. Health and Environmental Sciences. Helena, MT.
- Leland, H. V., S. V. Fend, T. L. Dudley, and J. L. Carter. 1989. Effects of copper on species composition of benthic insects in a Serria Nevada, California, stream. *Freshwater Biol.* 21:361-365.
- Lynch, T. R., C. J. Popp, and G. Z. Jacobi. 1988. Aquatic insects as environmental monitors of trace metal contamination: Red River, New Mexico. *Water Air Soil Pollution.* 42: 19-31.
- McGuire, D. L. 1983a. Aquatic macroinvertebrates in the Missouri River below Hauser Dam. Compl. Rep. submitted to Montana Power Co. Butte, MT.

McGuire, D. L. 1983b. A pre-impoundment study of aquatic macroinvertebrates in the Missouri River, Belt Creek and Highwood Creek near the proposed Carter Ferry Dam. Compl. Rep. submitted to Montana Power Co. Butte, MT.

McGuire, D. L. 1984. Aquatic macroinvertebrate community structure in the Clark Fork River below Milltown Dam during August and October 1980, 1981 and 1984. Compl. Rep. submitted to Montana Power Co. Butte, MT.

McGuire, D. L. 1987. Clark Fork River macroinvertebrate study, 1986. Technical report prepared for Montana Governor's Office. Helena.

McGuire, D. L. 1989a. Clark Fork River macroinvertebrate survey, August, 1987. Technical report prepared for the Montana Department of Health and Environmental Sciences/Water Quality Bureau.

McGuire, D. L. 1989b. Clark Fork River macroinvertebrate survey, August, 1988. Technical report prepared for the Montana Department of Health and Environmental Sciences/Water Quality Bureau.

McGuire, D. L. 1990. Aquatic macroinvertebrate surveys in the Clark Fork River, 1986 to 1988. In: V. Watson (ed.). Clark Fork River Symposium Proceedings. Mont. Acad. Sci. Missoula MT.

McGuire, D. L. 1992. Montana Reference streams project: 1991 aquatic macroinvertebrate surveys. Technical report prepared for the Montana Department of Health and Environmental Sciences/Water Quality Bureau.

Merritt, R. W. and K.W. Cummins. 1984. An introduction to the aquatic insects of North America. 2nd Ed. Kendall/Hunt Publishing Co. Dubuque, Iowa.

Montana Power Company. 1982. Milltown Dam environmental report: suspended sediments, metals and macroinvertebrates in the Clark Fork River. Butte, MT.

- Plafkin, J. L., M. T. Barbour, K. D. Porter, S. K. Gross, and R. M. Hughes. 1989. Rapid bioassessment protocols for use in streams and rivers: benthic macroinvertebrates and fish. U.S. EPA/444/4-89-001.
- Rades, D. L. 1985. An overview of Champion International's benthological water quality studies of the Clark Fork River. In: Carlson and Bahls (eds.). Proceedings of the Clark Fork River Symposium. Montana Tech. Butte.
- Rolin, R. A. 1988. The effects of heavy metal pollution of the upper Arkansas River on the distribution of aquatic macroinvertebrates. *Hydrobiologia* 160:3-8.
- Spence, L. E. 1975. Upper Blackfoot River Study -- A preliminary inventory of aquatic and wildlife resources. Montana Dept. Fish and Game in cooperation with Anaconda Company.
- Weber, C. I. (ed). 1973. Biological field and laboratory methods for measuring the quality of surface waters and effluents. U. S. EPA. Cincinnati, OH. (670/4-73-001).
- Wiederholm, T. 1984. Responses of aquatic insects to environmental pollution. In: Resh, V. H. and D. M. Rosenberg (eds.). The Ecology of Aquatic Insects. Praeger Publ. New York.
- Winner, R. W., M. W. Boessel and M. P. Farrel. 1980. Insect community structure as an index of heavy-metal pollution in lotic ecosystems. *Can. J. Fish. Aq. Sci.* 37:647-55.
- Wisseman, B. 1992. Montana reference streams project: benthic invertebrate studies, 1990. Report prepared for the Montana Department of Health and Environmental Sciences/Water Quality Bureau.
- Wisseman, B. 1993. Clark Fork River macroinvertebrate data, 1990 and 1991. Prepared for the Montana Department of Health and Environmental Sciences/Water Quality Bureau.
- Yasuno, M., S. Hataeyama and Y. Sugaya. 1985. Characteristic distribution of chironomids in rivers polluted with heavy metals. *Verh. Int. Ver. Limnol.* 22:2371-2377.
- Zar, J. H. 1974. Biostatistical analysis. Prentice-Hall, Inc. NJ.

APPENDIX A

Macroinvertebrate Checklist for the Clark Fork River with biotic and metals tolerance values

Appendix A. Aquatic macroinvertebrates collected from the Clark Fork River basin during August, 1986-1992 and tolerance values used to calculate biotic and metals tolerance indices.

class	order	family	genus	species	biotic index	metals tolerance
INSECTA						
	Coleoptera					
		Dytiscidae				7
			<i>Agabetes</i>	<i>sp.</i>		
			<i>Agabus</i>	<i>sp.</i>		
			<i>Deronectes</i>	<i>sp.</i>		
			<i>Hydroprus</i>	<i>sp.</i>		
			<i>Hydrovatus</i>	<i>sp.</i>		
			<i>Hygrotus</i>	<i>sp.</i>		
			<i>Illybius</i>	<i>sp.</i>		
			<i>Oreodytes</i>	<i>spp.</i>		
		Elmidae				
			<i>Cleptelmis</i>	<i>ornata</i>	4	4
			<i>Dubiraphia</i>	<i>sp.</i>	6	4
			<i>Heterlimnius</i>	<i>corpulentus</i>	3	3
			<i>Laraavara</i>		1	1
			<i>Microcylloepus</i>	<i>sp.</i>	5	4
			<i>Narpus</i>	<i>concolor</i>	2	1
			<i>Optioservus</i>	<i>spp.</i>	5	5
			<i>Ordobrevia</i>	<i>sp.</i>	5	3
			<i>Stenelmis</i>	<i>sp.</i>	5	3
			<i>Zaitzevia</i>	<i>parvula</i>	4	3
		Halipilidae				7
			<i>Brychius</i>	<i>sp.</i>		
			<i>Halipilus</i>	<i>sp.</i>		
		Hydrophilidae				7
	Plecoptera					
		Capniidae			1	0
		Chloroperlidae				
			Chloroperlinae		1	2
			<i>Kathroperla</i>	<i>perdita</i>	1	2
		Nemouridae				
			<i>Amphinemura</i>	<i>sp.</i>	2	1
			<i>Zapada</i>	<i>cinctipes</i>	3	3
			<i>Malenka</i>	<i>sp.</i>	1	1
		Perlidae				
			<i>Calineuria</i>	<i>californica</i>	2	3
			<i>Claassenia</i>	<i>sabulosa</i>	3	3
			<i>Hesperoperla</i>	<i>pacifica</i>	1	3
		Perlodidae				
			<i>Isoperla</i>	<i>sp.</i>	2	3
			<i>Isogenoides</i>	<i>sp.</i>	3	2
			<i>Skwala</i>	<i>sp.</i>	3	3
		Pteronarcidae				
			<i>Pteronarcella</i>	<i>badia</i>	3	4
			<i>Pteronarcys</i>	<i>californica</i>	2	1
		Taeniopterygidae			2	1

Appendix A. continued.

class	order	family	genus	species	biotic index	metals tolerance
	Diptera					
		Chironomidae				
		Tanypodinae				
			<i>Ablabesmyia</i>	<i>sp.</i>	8	3
			<i>Macropelopia</i>	<i>sp.</i>	6	5
			<i>Thienemannimyia</i>	<i>gp.</i>	5	3
			<i>Pentaneura</i>	<i>sp.</i>	6	2
			<i>Procladius</i>	<i>sp.</i>	9	5
		Diamesinae				
			<i>Diamesa</i>	<i>sp.</i>	5	9
			<i>Pagastia</i>	<i>sp.</i>	1	9
			<i>Potthastia</i>	<i>gaeddi gp.</i>	2	5
			<i>P. longimanus</i>	<i>gp.</i>	2	5
		Prodiamesinae				
			<i>Monodiamesa</i>	<i>sp.</i>	7	5
			<i>Odontomesa</i>	<i>sp.</i>	4	5
			<i>Prodiamesa</i>	<i>sp.</i>	3	3
		Orthocladinae				
			<i>Cardiocladius</i>	<i>spp.</i>	5	9
			<i>Corynoneura</i>	<i>sp.</i>	7	4
			<i>Cricotopus</i>	<i>spp.</i>	7	10
			<i>C. (Nostococladius)</i>	<i>sp.</i>	6	5
			<i>Eukiefferiella</i>	<i>spp.</i>	8	9
			<i>E. (devonica)</i>	<i>gp.</i>	8	7
			<i>Nanocladius</i>	<i>sp.</i>	3	4
			<i>Orthocladius</i>	<i>spp.</i>	6	5
			<i>Parametriocnemus</i>	<i>sp.</i>	5	4
			<i>Paraphaenocladius</i>	<i>sp.</i>	4	4
			<i>Rheocricotopus</i>	<i>sp.</i>	4	5
			<i>Symbiocladius</i>	<i>sp.</i>	4	1
			<i>Synorthocladius</i>	<i>sp.</i>	2	1
			<i>Tvetenia</i>	<i>sp.</i>	5	4
		Chironominae				
		Chironomini				
			<i>Chironomus</i>	<i>sp.</i>	10	7
			<i>Cryptochironomus</i>	<i>sp.</i>	8	5
			<i>Demicryptochironomus</i>	<i>sp.</i>	8	4
			<i>Dicrotendipes</i>	<i>sp.</i>	8	5
			<i>Endochironomus</i>	<i>sp.</i>	10	6
			<i>Glyptotendipes</i>	<i>sp.</i>	10	4
			<i>Microtendipes</i>	<i>sp.</i>	6	4
			<i>Parachironomus</i>	<i>sp.</i>	10	4
			<i>Paracladopelma</i>	<i>sp.</i>	7	4
			<i>Phaenopsectra</i>	<i>sp.</i>	7	4
			<i>Polypedilum</i>	<i>spp.</i>	6	4
			<i>Psuedochironomus</i>	<i>sp.</i>	5	4
			<i>Xenochironomus</i>	<i>sp.</i>	4	0

Appendix A. continued.

class	order	family	genus	species	biotic index	metals tolerance
			Tanytarsini			
			<i>Cladotanytarsus</i>	<i>sp.</i>	7	3
			<i>Micropsectra</i>	<i>spp.</i>	4	1
			<i>Paratanytarsus</i>	<i>sp.</i>	6	3
			<i>Stempellina</i>	<i>sp.</i>	2	0
			<i>Rheotanytarsus</i>	<i>sp.</i>	6	1
			<i>Tanytarsus</i>	<i>sp.</i>	6	3
		Tipulidae				
			<i>Antocha</i>	<i>sp.</i>	3	4
			<i>Dicranota</i>	<i>sp.</i>	3	2
			<i>Hexatoma</i>	<i>sp.</i>	2	2
			<i>Tipula</i>	<i>sp.</i>	4	3
		Athericidae				
			<i>Atherix</i>	<i>pachypus</i>	4	4
		Simuliidae				
			<i>Simulium</i> (<i>Eusimulium</i>)	<i>spp.</i>	5	5
			<i>Simulium</i> (<i>Psilozoa</i>)	<i>sp.</i>	7	7
		Empididae				
			<i>Chelifera</i>	<i>sp.</i>	5	4
			<i>Clinocera</i>	<i>sp.</i>	5	4
			<i>Hemerodromia</i>	<i>sp.</i>	6	4
		Tanyteridae				
			<i>Protanyderus</i>	<i>sp.</i>	5	1
		Muscidae				
			<i>Limnophora</i>	<i>sp.</i>	6	7
		Ceratopogonidae				
			Ceratopogoninae		6	4
		Culicidae				
			<i>Aedes</i>	<i>sp.</i>	7	5
		Dolichopodidae			4	4
		Stratiomyidae				
			<i>Euparyphus</i>	<i>sp.</i>	7	4
		Psychodidae				
			<i>Pericoma</i>	<i>sp.</i>	4	4
	Hemiptera					
		Corixidae				5
			<i>Hesperocorixa</i>	<i>laevigata</i>		
			<i>Sigara</i>	<i>sp.</i>		
		Saldidae				
			<i>Salda</i>	<i>sp.</i>		
	Lepidoptera					
		Pyalidae				
			<i>Petrophila</i>	<i>sp.</i>	5	3
	Megaloptera					
		Sialidae				
			<i>Sialis</i>	<i>sp.</i>	4	4
	Odonata					
		Gomphidae				
			<i>Ophiogomphus</i>	<i>sp.</i>	5	4

Appendix A. continued.

class	order	family	genus	species	biotic index	metals tolerance
	Trichoptera					
		Brachycentridae				
			<i>Brachycentrus</i>	<i>americanus</i>	1	4
			<i>Brachycentrus</i>	<i>occidentalis</i>	2	3
		Glossosomatidae				
			<i>Agapetus</i>	<i>sp.</i>	0	2
			<i>Glossosoma</i>	<i>sp.</i>	0	2
			<i>Protoptila</i>	<i>sp.</i>	1	2
		Helicopsycidae				
			<i>Helicopsyche</i>	<i>sp.</i>	3	3
		Hydropsychidae				
			<i>Arctopsyche</i>	<i>grandis</i>	2	3
			<i>Cheumatopsyche</i>	<i>spp.</i>	5	5
			<i>Hydropsyche</i>	<i>spp.</i>	5	5
			<i>H. (H.)</i>	<i>occidentalis</i>	5	5
			<i>H. (Ceratopsyche)</i>	<i>spp.</i>	5	5
			<i>H.(C.)</i>	<i>cockerelli</i>	4	4
			<i>H. (C.)</i>	<i>morosa?</i>	6	5
			<i>H. (C.)</i>	<i>oslari</i>	3	6
			<i>H. (C.)</i>	<i>slossonae</i>	4	6
		Hydroptilidae				
			<i>Hydroptila</i>	<i>spp.</i>	6	4
			<i>Leucotrichia</i>	<i>pictipes</i>	2	1
			<i>Neotrichia</i>	<i>sp.</i>	2	2
			<i>Ochrotrichia</i>	<i>sp.</i>	4	3
			<i>Oxyethira</i>	<i>sp.</i>	3	2
			<i>Zumatrichia</i>	<i>notosa</i>	3	1
		Lepidostomatidae				
			<i>Lepidostoma</i>	<i>sp.</i>	1	1
		Leptoceridae				
			<i>Ceraclea</i>	<i>sp.</i>	3	1
			<i>Oecetis</i>	<i>sp.</i>	8	3
			<i>Nectopsyche</i>	<i>sp.</i>	3	3
			<i>Trianodes</i>	<i>sp.</i>	6	1
		Limnephilidae				
			<i>Dicosmoecus</i>	<i>sp.</i>	2	1
			<i>Ecclisomyia</i>	<i>sp.</i>	4	2
			<i>Limnephilus</i>	<i>sp.</i>	3	2
			<i>Onocosmoecus</i>	<i>sp.</i>	3	2
			<i>Neophylax</i>	<i>sp.</i>	3	2
		Philopotamidae				
			<i>Wormaldia</i>	<i>sp.</i>	0	1
		Polycentropididae				
			<i>Polycentropis</i>	<i>sp.</i>	6	1
		Psychomyiidae				
			<i>Psychomyia</i>	<i>sp.</i>	2	1
		Rhyacophilidae				
			<i>Rhyacophila</i>	<i>angeleta gp.</i>	0	1
			<i>R.</i>	<i>coloradensis gp.</i>	0	1

Appendix A. continued.

class	order	family	genus	species	biotic index	metals tolerance
	Ephemeroptera					
		Baetidae				
			<i>Acentrella</i>	<i>insignificans</i>	4	4
			<i>A.</i>	<i>turbida</i>	4	3
			<i>Baetis</i>	<i>punctiventris</i> (<i>Pseudocloeon</i>)	6	3
			<i>B.</i>	<i>tricaudatus</i>	4	5
			<i>Callibaetis</i>	<i>sp.</i>	9	1
			<i>Dipheter</i>	<i>hageni</i>	5	1
		Ephemerellidae				
			<i>Attenella</i>	<i>margarita</i>	3	1
			<i>Caudatella</i>	<i>heterocaudata</i>	0	0
			<i>Drunella</i>	<i>coloradensis</i>	0	0
			<i>D.</i>	<i>doddsi</i>	1	0
			<i>D.</i>	<i>flavilinea</i>	2	0
			<i>D.</i>	<i>grandis</i>	2	1
			<i>Ephemerella</i>	<i>inermis</i>	4	3
			<i>Serratella</i>	<i>tibialis</i>	2	1
			<i>Timpanoga</i>	<i>hecuba</i>	2	1
		Heptageniidae				
			<i>Cinygmula</i>	<i>sp.</i>	0	0
			<i>Epeorus</i>	<i>spp.</i>	2	0
			<i>E.</i>	<i>albertae</i>	2	0
			<i>E.</i>	<i>longimanus</i>	1	0
			<i>Heptagenia</i>	<i>soltari</i>	3	1
			<i>Nixe</i>	<i>sp.</i>	4	1
			<i>Rhithrogena</i>	<i>sp.</i>	0	2
			<i>Stenonema</i>	<i>(terminum)?</i>	4	1
		Leptophlebiidae				
			<i>Paraleptophlebia</i>	<i>spp.</i>	1	1
			<i>P.</i>	<i>bicornuta</i>	2	1
			<i>P.</i>	<i>debilis</i>	1	1
		Siphonuridae				
			<i>Ameletus</i>	<i>sp.</i>	0	1
		Tricorythidae				
			<i>Tricorythodes</i>	<i>minutus</i>	4	4

Appendix A. concluded.

class	order	family	genus	species	biotic index	metals tolerance
ANNELIDA						
	Oligochaeta					
		Lumbricidae			4	1
		Lumbriculidae			4	1
		Naididae			8	5
		Tubificidae			10	6
	Hirudinea					
		Erpobdellidae			8	4
		Glossophoniidae			9	4
			<i>Glossiphonia</i>	<i>complanata</i>	9	4
			<i>Helobdella</i>	<i>stagnalis</i>	10	4
CRUSTACEA						
	Amphipoda					
		Talitridae				
			<i>Hyallela</i>	<i>azteca</i>	8	3
	Isopoda					
		Asellidae				
			<i>Caetidotea</i>	<i>sp. (Asellus)</i>	8	5
	Decapoda					
		Astacidae				
			<i>Pacifasticus</i>	<i>sp.</i>	6	3
MOLLUSCA						
	Gastropoda					
		Ancyclidae				
			<i>Ferrissia</i>	<i>rivularis</i>	6	1
		Lymnaeidae				
			<i>Fossaria</i>	<i>spp.</i>	6	3
			<i>Stagnicola</i>	<i>sp.</i>	6	3
			<i>Fisherola</i>	<i>nutalli</i>	3	1
		Physidae				
			<i>Physella</i>	<i>sp.</i>	8	4
		Planorbidae				
			<i>Gyraulus</i>	<i>sp.</i>	8	3
		Valvatidae				
			<i>Valvata</i>	<i>humeralis</i>	3	1
	Pelecypoda					
		Sphaeriidae			8	3
TURBELLARIA					4	3
NEMATODA					5	5
ACARI					5	5
CNIDARIA					8	3
			<i>Hydra</i>	<i>sp.</i>		

APPENDIX B

1991 Clark Fork River Macroinvertebrate Data

MACROINVERTEBRATE DATA								
SILVER BOW CREEK above Butte WWTP - STATION 00 - 15 AUG 91								
Taxon	sample1	sample2	sample3	sample4	SUM	%RA	MEAN	S. D.
COLEOPTERA						4%	13	
<i>Optioservus spp.</i>	0	11	4	6	21	2%	5.3	4.6
<i>Zaitzevia sp.</i>	1	0	0	1	2	0%	0.5	0.6
<i>Agabus sp.</i>	2	2	3	2	9	1%	2.3	0.5
<i>Brychius sp.</i>	0	5	3	11	19	1%	4.8	4.6
DIPTERA						95%	329	
<i>Thienemannimyia gp.</i>	0	3	1	3	7	1%	1.8	1.5
<i>Pagastia sp</i>	13	37	61	120	231	17%	57.8	45.9
<i>Cardiocladius spp.</i>	39	149	202	166	556	40%	139.0	70.2
<i>Cricotopus spp.</i>	22	50	150	279	501	36%	125.3	116.3
<i>Simulium (Psilozoa)</i>	0	1	0	0	1	0%	0.3	0.5
<i>Limnophora sp.</i>	0	6	5	7	18	1%	4.5	3.1
EPHEMEROPTERA						0%	0	
<i>Tricorythodes minutus</i>	0	1	0	0	1	0%	0.3	0.5
TRICHOPTERA						1%	3	
<i>H. (Ceratopsyche) spp.?</i>	0	4	3	3	10	1%	2.5	1.7
TOTAL ORGANISMS	77	269	432	598	1376		344	223
TAXA RICHNESS	5	11	9	10	12		9	2.6
SHAN. DIVERSITY	1.66	2.01	1.75	1.86	1.92		1.82	0.15
BIOTICINDEX	4.88	4.89	5.16	5.16	5.09		5.02	0.16
EPT RICHNESS	0	2	1	1	2		1	0.8
% R.A. DOMINANT	51%	55%	47%	47%	40%		50%	4.1%
% R.A. FILTERERS	0%	2%	1%	1%	1%		1%	0.8%
METALS TOLERANCE	9.25	8.94	9.29	9.38	9.26		9.21	0.19
Baetidae/Ephemeroptera	UD	0.00	UD	UD	0.00		0.00	#####
Hydropsychinae/Trichoptera	UD	1.00	1.00	1.00	1.00		1.00	0.00
EPT / (EPT + CHIR.)	0.00	0.02	0.01	0.01	0.01		0.01	0.01
ID's by D. McGuire								

MACROINVERTEBRATE DATA								
SILVER BOW CREEK below Colorado Tailings - STATION 01 - 15 AUG 91								
Taxon	sample1	sample2	sample3	sample4	SUM	%RA	MEAN	S. D.
COLEOPTERA						2%	8	
<i>Optioservus spp.</i>	3	5	10	2	20	1%	5.0	3.6
<i>Agabus sp.</i>	0	1	0	1	2	0%	0.5	0.6
<i>Illybius sp.</i>	0	1	0	1	2	0%	0.5	0.6
<i>Oreodytes spp.</i>	0	0	0	1	1	0%	0.3	0.5
<i>Brychius sp.</i>	2	2	2	1	7	0%	1.8	0.5
DIPTERA						92%	435	
<i>Thienemannimyia gp.</i>	0	2	1	0	3	0%	0.8	1.0
<i>Pagastia sp</i>	14	5	13	8	40	2%	10.0	4.2
<i>Cardiocladius spp.</i>	73	149	251	71	544	29%	136.0	84.8
<i>Cricotopus spp.</i>	83	166	212	147	608	32%	152.0	53.5
<i>Eukiefferiella spp.</i>	9	5	15	5	34	2%	8.5	4.7
<i>Chironomus sp.</i>	1	0	0	0	1	0%	0.3	0.5
<i>Simulium (Psilozoa)</i>	103	136	160	107	506	27%	126.5	26.7
<i>Limnophora sp.</i>	0	0	4	0	4	0%	1.0	2.0
<i>Chelifera sp.</i>	0	0	0	1	1	0%	0.3	0.5
ANNELIDA						6%	30	
Tubificidae	16	2	81	20	119	6%	29.8	35.0
TOTAL ORGANISMS	304	474	749	365	1892		473	197
TAXA RICHNESS	9	11	10	12	15		11	1.3
SHAN. DIVERSITY	2.25	1.92	2.24	2.10	2.20		2.13	0.16
BIOTIC INDEX	6.41	6.29	6.54	6.63	6.47		6.47	0.15
EPT RICHNESS	0	0	0	0	0		0	0.0
% R.A. DOMINANT	34%	35%	34%	40%	32%		36%	3.1%
% R.A. FILTERERS	34%	29%	21%	29%	27%		28%	5.2%
METALS TOLERANCE	8.79	8.99	8.81	8.96	8.88		8.89	0.10
Baetidae/Ephemeroptera	NA	NA	NA	NA	NA		*1.00	#####
Hydropsychinae/Trichoptera	NA	NA	NA	NA	NA		*1.00	#####
EPT / (EPT + CHIR.)	0.00	0.00	0.00	0.00	0.00		0.0	0.0
ID's by D. McGuire								
* default value								

MACROINVERTEBRATE DATA								
SILVER BOW CREEK at Miles Crossing - STATION 02 - 15 AUG 91								
Taxon	sample1	sample2	sample3	sample4	SUM	%RA	MEAN	S. D.
COLEOPTERA						3%	4	
<i>Optioservus spp.</i>	5	1	2	3	11	2%	2.8	1.7
<i>Zaitzevia sp.</i>	0	0	1	0	1	0%	0.3	0.5
<i>Agabus sp.</i>	0	1	0	0	1	0%	0.3	0.5
<i>Hydrovatus sp.</i>	1	0	0	0	1	0%	0.3	0.5
DIPTERA						48%	55	
<i>Thienemannimyia gp.</i>	0	0	0	1	1	0%	0.3	0.5
<i>Pagastia sp</i>	7	4	23	52	86	19%	21.5	22.0
<i>Cardiocladius spp.</i>	7	7	9	14	37	8%	9.3	3.3
<i>Cricotopus spp.</i>	8	1	32	22	63	14%	15.8	13.9
<i>Eukiefferiella spp.</i>	3	5	13	10	31	7%	7.8	4.6
<i>Simulium (Psilozoa)</i>	0	1	0	0	1	0%	0.3	0.5
<i>Chelifera sp.</i>	1	0	0	0	1	0%	0.3	0.5
TRICHOPTERA						48%	56	
<i>Cheumatopsyche spp.</i>	0	0	1	1	2	0%	0.5	0.6
<i>H. (Ceratopsyche) spp.?</i>	73	22	60	61	216	47%	54.0	22.1
<i>Brachycentrus americanus</i>	0	2	1	1	4	1%	1.0	0.8
ANNELIDA						1%	1	
Tubificidae	1	1	1	1	4	1%	1.0	0.0
TOTAL ORGANISMS	106	45	143	166	460		115	53
TAXA RICHNESS	9	10	10	10	15		10	0.5
SHAN. DIVERSITY	1.71	2.39	2.29	2.27	2.31		2.17	0.31
BIOTIC INDEX	5.03	5.00	5.08	4.21	4.75		4.83	0.41
EPT RICHNESS	1	2	3	3	3		2	1.0
% R.A. DOMINANT	69%	49%	42%	37%	47%		49%	14.1%
% R.A. FILTERERS	69%	56%	43%	38%	48%		51%	13.8%
METALS TOLERANCE	6.81	7.22	7.84	7.89	7.56		7.44	0.52
Baetidae/Ephemeroptera	NA	NA	NA	NA	NA		*1.00	#####
Hydropsychinae/Trichoptera	1.00	0.92	0.98	0.98	0.98		0.97	0.04
EPT / (EPT + CHIR.)	0.74	0.59	0.45	0.39	0.50		0.54	0.16
ID's by D. McGuire								
* default value								

MACROINVERTEBRATE DATA								
SILVER BOW CREEK @ Frontage Road - STATION 03 - 15 AUG 91								
Taxon	sample1	sample2	sample3	sample4	SUM	%RA	MEAN	S. D.
COLEOPTERA						1%	2	
<i>Optioservus spp.</i>	1	0	0	3	4	0%	1.0	1.4
<i>Hydrovatus sp.</i>	0	5	0	0	5	1%	1.3	2.5
DIPTERA						46%	101	
Tanypodiinae	0	2	0	0	2	0%	0.5	1.0
<i>Pagastia sp</i>	27	30	11	26	94	11%	23.5	8.5
<i>Cardiocladius spp.</i>	36	33	29	55	153	17%	38.3	11.5
<i>Cricotopus spp.</i>	23	60	5	9	97	11%	24.3	25.1
<i>Eukiefferiella spp.</i>	8	21	6	15	50	6%	12.5	6.9
<i>Antocha sp.</i>	0	1	1	1	3	0%	0.8	0.5
<i>Simulium (Psilozoa)</i>	1	0	1	3	5	1%	1.3	1.3
MEGALOPTERA								
<i>Sialis sp.</i>	0	1	0	0	1	0%	0.3	0.5
TRICHOPTERA						53%	117	
<i>Cheumatopsyche spp.</i>	1	4	1	3	9	1%	2.3	1.5
<i>Hydropsyche occidentalis</i>	0	2	1	0	3	0%	0.8	1.0
<i>H. (Ceratopsyche) spp.?</i>	41	139	53	164	397	45%	99.3	61.4
<i>Hydroptila spp.</i>	2	2	0	0	4	0%	1.0	1.2
<i>Brachycentrus americanus</i>	6	31	2	14	53	6%	13.3	12.8
TOTAL ORGANISMS	146	331	110	293	880		220	108
TAXA RICHNESS	10	13	10	10	15		11	1.5
SHAN. DIVERSITY	2.53	2.54	2.13	2.05	2.44		2.31	0.26
BIOTIC INDEX	4.60	4.82	4.77	4.68	4.73		4.72	0.10
EPT RICHNESS	4	5	4	3	5		4	0.8
% R.A. DOMINANT	28%	42%	48%	56%	45%		44%	11.8%
% R.A. FILTERERS	34%	53%	53%	63%	53%		51%	12.3%
METALS TOLERANCE	8.06	7.38	7.42	7.08	7.40		7.48	0.41
Baetidae/Ephemeroptera	NA	NA	NA	NA	NA		*1.00	#####
Hydropsychinae/Trichoptera	0.84	0.81	0.96	0.92	0.88		0.89	0.07
EPT / (EPT + CHIR.)	0.35	0.55	0.53	0.63	0.54		0.51	0.12
ID's by D. McGuire								

MACROINVERTEBRATE DATA								
AMC POND #2 DISCHARGE - STATION 04 - 16 Aug 91								
Taxon	sample1	sample2	sample3	sample4	SUM	%RA	MEAN	S. D.
COLEOPTERA						6%	120	
<i>Optioservus spp.</i>	52	67	187	130	436	6%	109.0	62.0
<i>Zaitzevia sp.</i>	1	7	24	8	40	1%	10.0	9.8
<i>Microcylloepus sp.</i>	1	1	0	0	2	0%	0.5	0.6
DIPTERA						1%	18	
<i>Cricotopus spp.</i>	6	1	2	7	16	0%	4.0	2.9
<i>Glyptotendipes sp.</i>	0	0	2	0	2	0%	0.5	1.0
<i>Polypedilum spp.</i>	3	0	1	3	7	0%	1.8	1.5
<i>Tanytarsus sp.</i>	0	0	2	3	5	0%	1.3	1.5
<i>Simulium (Psilozoa)</i>	12	0	18	12	42	1%	10.5	7.5
ODONATA								
<i>Ophiogomphus sp.</i>	0	0	1	0	1	0%	0.3	0.5
<i>Enallagma sp.</i>	1	0	0	0	1	0%	0.3	0.5
TRICHOPTERA						89%	1742	
<i>Cheumatopsyche spp.</i>	382	276	660	575	1893	24%	473.3	175.6
<i>Hydropsyche occidentalis</i>	154	74	232	280	740	9%	185.0	90.4
<i>H. (Ceratopsyche) spp.?</i>	1039	633	1350	1285	4307	55%	1076.8	324.7
<i>Lepidostoma sp.</i>	0	0	1	0	1	0%	0.3	0.5
<i>Oecetis sp.</i>	7	0	6	11	24	0%	6.0	4.5
<i>Helicopsyche borealis</i>	0	1	1	0	2	0%	0.5	0.6
ANNELIDA						1%	17	
Erpobdellidae	18	7	12	25	62	1%	15.5	7.8
<i>Glossiphonia complanata</i>	0	1	0	0	1	0%	0.3	0.5
<i>Helobdella stagnalis</i>	0	1	2	2	5	0%	1.3	1.0
CRUSTACEA								
<i>Hyallela azteca</i>	34	23	36	43	136	2%	34.0	8.3
MOLLUSCA						1%	21	
<i>Physella sp.</i>	6	7	18	45	76	1%	19.0	18.2
<i>Gyraulus sp.</i>	0	0	4	2	6	0%	1.5	1.9
<i>Sphaeriidae</i>	0	0	0	2	2	0%	0.5	1.0

MACROINVERTEBRATE DATA								
AMC POND #2 DISCHARGE - STATION 04 - 16 Aug 91								
Taxon	sample1	sample2	sample3	sample4	SUM	%RA	MEAN	S. D.
TOTAL ORGANISMS	1716	1099	2559	2433	7807		1952	679
TAXA RICHNESS	14	13	19	16	23		16	2.6
SHAN. DIVERSITY	1.74	1.77	1.95	2.01	1.92		1.87	0.13
BIOTIC INDEX	5.14	5.10	5.10	5.18	5.13		5.13	0.04
EPT RICHNESS	4	4	6	4	6		5	1.0
% R.A. DOMINANT	61%	58%	53%	53%	55%		56%	3.8%
% R.A. FILTERERS	92%	89%	88%	88%	89%		90%	1.9%
METALS TOLERANCE	5.85	5.85	5.85	5.79	5.83		5.84	0.03
Baetidae/Ephemeroptera	NA	NA	NA	NA	NA		*1.00	#####
Hydropsychinae/Trichoptera	1.00	1.00	1.00	0.99	1.00		1.00	0.00
EPT / (EPT + CHIR.)	0.99	1.00	1.00	0.99	1.00		1.00	0.00
ID's by D. McGuire								
* maximum value by default								

MACROINVERTEBRATE DATA								
MILL-WILLOW BYPASS - STATION 05 - 16 AUG 91								
Taxon	sample1	sample2	sample3	sample4	SUM	%RA	MEAN	S. D.
COLEOPTERA						0%	1	
<i>Optioservus spp.</i>	2	0	1	1	4	0%	1.0	0.8
DIPTERA						56%	227	
<i>Thienemannimyia gp.</i>	1	0	1	0	2	0%	0.5	0.6
<i>Diamesa spp.</i>	0	0	1	0	1	0%	0.3	0.5
<i>Pagastia sp</i>	16	9	21	9	55	3%	13.8	5.9
<i>Cardiocladius spp.</i>	8	3	11	11	33	2%	8.3	3.8
<i>Cricotopus spp.</i>	0	0	0	2	2	0%	0.5	1.0
<i>Eukiefferiella spp.</i>	1	0	4	15	20	1%	5.0	6.9
<i>Paraphaenocladius sp.</i>	1	0	0	1	2	0%	0.5	0.6
<i>Tvetenia sp.</i>	1	1	2	3	7	0%	1.8	1.0
<i>Dicrotendipes sp.</i>	0	0	0	1	1	0%	0.3	0.5
<i>Polypedilum spp.</i>	4	0	9	18	31	2%	7.8	7.8
<i>Microtendipes sp</i>	3	7	9	0	19	1%	4.8	4.0
<i>Antocha sp.</i>	2	1	0	1	4	0%	1.0	0.8
<i>Simulium (Psilozoa)</i>	172	82	326	148	728	45%	182.0	103.3
<i>Hemerodromia sp.</i>	0	0	0	1	1	0%	0.3	0.5
EPHEMEROPTERA						19%	78	
<i>Ameletus sp.</i>	0	0	1	0	1	0%	0.3	0.5
<i>Baetis tricaudatus</i>	41	90	82	87	300	18%	75.0	22.9
<i>Drunella grandis</i>	0	3	1	0	4	0%	1.0	1.4
<i>Nixe sp.</i>	0	1	0	0	1	0%	0.3	0.5
<i>Paraleptophlebia debilis</i>	0	0	3	2	5	0%	1.3	1.5
PLECOPTERA						0%	1	
<i>Hesperoperla pacifica</i>	0	0	0	1	1	0%	0.3	0.5
<i>Pteronarcella badia</i>	1	0	0	0	1	0%	0.3	0.5
TRICHOPTERA						25%	102	
<i>Cheumatopsyche spp.</i>	6	2	12	2	22	1%	5.5	4.7
<i>Hydropsyche occidentalis</i>	9	11	3	27	50	3%	12.5	10.2
<i>Hydropsyche cockerelli</i>	0	0	0	1	1	0%	0.3	0.5
<i>H. (Ceratopsyche) spp.?</i>	52	53	175	49	329	20%	82.3	61.9
<i>Hydroptila spp.</i>	1	0	0	3	4	0%	1.0	1.4
<i>Oecetis sp.</i>	0	1	0	0	1	0%	0.3	0.5

MACROINVERTEBRATE DATA								
MILL-WILLOW BYPASS - STATION 05 - 16 AUG 91								
Taxon	sample1	sample2	sample3	sample4	SUM	%RA	MEAN	S. D.
TOTAL ORGANISMS	321	264	662	383	1630		408	176
TAXA RICHNESS	17	13	17	20	28		17	2.9
SHAN. DIVERSITY	2.28	2.34	2.12	2.71	2.45		2.36	0.25
BIOTIC INDEX	5.77	5.14	5.75	5.62	5.62		5.57	0.30
EPT RICHNESS	6	7	7	8	13		7	0.8
% R.A. DOMINANT	54%	34%	49%	39%	45%		44%	9.1%
% R.A. FILTERERS	74%	56%	78%	59%	69%		67%	10.9%
METALS TOLERANCE	7.10	6.28	6.95	6.67	6.81		6.75	0.36
Baetidae/Ephemeroptera	1.00	0.96	0.94	0.98	0.96		0.97	0.02
Hydropsychinae/Trichoptera	0.99	0.99	1.00	0.96	0.99		0.98	0.02
EPT / (EPT + CHIR.)	0.76	0.89	0.83	0.74	0.81		0.80	0.07
ID's by D. McGuire								

MACROINVERTEBRATE DATA								
WARM SPRINGS CREEK near mouth - STATION 06 - 16 AUG 91								
Taxon	sample1	sample2	sample3	sample4	SUM	%RA	MEAN	S. D.
COLEOPTERA						11%	61	
<i>Optioservus spp.</i>	54	21	29	99	203	9%	50.8	35.1
<i>Zaitzevia sp.</i>	1	0	2	4	7	0%	1.8	1.7
<i>Cleptelmis ornata</i>	1	1	10	13	25	1%	6.3	6.2
<i>Oreodytes spp.</i>	4	2	0	3	9	0%	2.3	1.7
DIPTERA						19%	110	
<i>Thienemannimyia gp.</i>	3	0	0	1	4	0%	1.0	1.4
<i>Pentaneura sp.</i>	8	1	0	1	10	0%	2.5	3.7
<i>Pagastia sp</i>	29	24	8	72	133	6%	33.3	27.3
<i>Potthastia gaeddi gp.</i>	5	0	0	0	5	0%	1.3	2.5
<i>Cardiocladius spp.</i>	0	0	0	1	1	0%	0.3	0.5
<i>Cricotopus spp.</i>	4	0	0	6	10	0%	2.5	3.0
<i>Eukiefferiella spp.</i>	0	0	1	0	1	0%	0.3	0.5
<i>Parametriocnemus sp.</i>	1	0	0	1	2	0%	0.5	0.6
<i>Tvetenia sp.</i>	0	0	1	3	4	0%	1.0	1.4
<i>Polypedilum spp.</i>	2	0	0	1	3	0%	0.8	1.0
<i>Microtendipes sp</i>	9	0	0	0	9	0%	2.3	4.5
<i>Phaenopsectra sp</i>	0	0	0	1	1	0%	0.3	0.5
<i>Rheotanytarsus sp.</i>	1	0	0	2	3	0%	0.8	1.0
<i>Micropsectra spp.</i>	3	2	18	58	81	3%	20.3	26.2
<i>Hexatoma sp.</i>	9	5	13	12	39	2%	9.8	3.6
<i>Tipula sp.</i>	17	1	1	1	20	1%	5.0	8.0
<i>Simulium (Eusimulium)</i>	2	1	104	2	109	5%	27.3	51.2
<i>Chelifera sp.</i>	0	1	3	1	5	0%	1.3	1.3
EPHEMEROPTERA						7%	40	
<i>Baetis tricaudatus</i>	5	29	30	21	85	4%	21.3	11.6
<i>Serratella tibialis</i>	0	0	1	0	1	0%	0.3	0.5
<i>Drunella doddsi</i>	0	1	1	0	2	0%	0.5	0.6
<i>Drunella grandis</i>	10	19	2	19	50	2%	12.5	8.2
<i>Nixe sp.</i>	1	0	0	0	1	0%	0.3	0.5
<i>Paraleptophlebia memorabil</i>	16	0	0	0	16	1%	4.0	8.0
<i>Tricorythodes minutus</i>	2	0	0	1	3	0%	0.8	1.0
PLECOPTERA						12%	67	
<i>Hesperoperla pacifica</i>	3	3	3	2	11	0%	2.8	0.5
<i>Malenka sp.</i>	4	0	0	7	11	0%	2.8	3.4
<i>Skwala parallela</i>	11	4	19	27	61	3%	15.3	9.9
<i>Pteronarcella badia</i>	22	9	66	89	186	8%	46.5	37.4

MACROINVERTEBRATE DATA								
WARM SPRINGS CREEK near mouth - STATION 06 - 16 AUG 91								
Taxon	sample1	sample2	sample3	sample4	SUM	%RA	MEAN	S. D.
TRICHOPTERA						52%	300	
<i>Arctopsyche grandis</i>	8	4	36	30	78	3%	19.5	15.9
<i>Cheumatopsyche</i> spp.	31	5	16	38	90	4%	22.5	14.8
<i>Hydropsyche occidentalis</i>	76	62	243	469	850	37%	212.5	189.7
<i>H. (Ceratopsyche) spp.?</i>	15	8	51	64	138	6%	34.5	27.2
<i>Hydroptila</i> spp.	10	0	3	8	21	1%	5.3	4.6
<i>Lepidostoma</i> sp.	1	0	0	1	2	0%	0.5	0.6
<i>Oecetis</i> sp.	5	9	2	0	16	1%	4.0	3.9
<i>Rhyacophila brunnea</i> gp.	0	1	2	1	4	0%	1.0	0.8
<i>Glossosoma</i> sp.	0	0	2	0	2	0%	0.5	1.0
MOLLUSCA						0%	3	
<i>Physella</i> sp.	5	0	0	0	5	0%	1.3	2.5
<i>Gyraulus</i> sp.	2	2	0	0	4	0%	1.0	1.2
<i>Stagnicola</i> sp.	1	0	1	0	2	0%	0.5	0.6
TOTAL ORGANISMS	381	215	668	1059	2323		581	370
TAXA RICHNESS	36	23	27	33	45		30	5.9
SHAN. DIVERSITY	4.18	3.45	3.19	3.08	3.60		3.48	0.50
BIOTIC INDEX	4.23	3.96	4.34	4.24	4.24		4.19	0.16
EPT RICHNESS	16	12	15	14	20		14	1.7
% R.A. DOMINANT	20%	29%	36%	44%	37%		32%	10.4%
% R.A. FILTERERS	35%	37%	67%	57%	55%		49%	15.7%
METALS TOLERANCE	4.85	5.08	4.62	4.93	4.84		4.87	0.19
Baetidae/Ephemeroptera	0.15	0.59	0.88	0.51	0.54		0.53	0.30
Hydropsychinae/Trichoptera	0.84	0.84	0.87	0.93	0.90		0.87	0.05
EPT / (EPT + CHIR.)	0.77	0.85	0.94	0.84	0.86		0.85	0.07
ID's by D. McGuire								

MACROINVERTEBRATE DATA								
CLARK FORK RIVER below Warm Springs Cr - STATION 07 -16 AUG 91								
Taxon	sample1	sample2	sample3	sample4	SUM	%RA	MEAN	S. D.
COLEOPTERA						16%	223	
<i>Optioservus spp.</i>	88	317	162	220	787	14%	196.8	96.7
<i>Zaitzevia sp.</i>	7	20	11	7	45	1%	11.3	6.1
<i>Cleptelmis ornata</i>	4	24	14	19	61	1%	15.3	8.5
DIPTERA						21%	298	
<i>Thienemannimyia gp.</i>	0	0	1	0	1	0%	0.3	0.5
<i>Pagastia sp</i>	7	20	4	22	53	1%	13.3	9.1
<i>Cardiocladius spp.</i>	2	2	0	0	4	0%	1.0	1.2
<i>Corynoneura sp</i>	0	3	0	0	3	0%	0.8	1.5
<i>Cricotopus spp.</i>	0	4	0	11	15	0%	3.8	5.2
<i>Eukiefferiella spp.</i>	2	7	0	1	10	0%	2.5	3.1
<i>Orthocladius spp.</i>	0	1	0	1	2	0%	0.5	0.6
<i>Paraphaenocladius sp.</i>	0	0	0	1	1	0%	0.3	0.5
<i>Tvetenia sp.</i>	0	1	0	0	1	0%	0.3	0.5
<i>Polypedilum spp.</i>	12	20	6	14	52	1%	13.0	5.8
<i>Microtendipes sp</i>	6	6	3	8	23	0%	5.8	2.1
<i>Phaenopsectra sp</i>	1	2	2	0	5	0%	1.3	1.0
<i>Micropsectra spp.</i>	0	1	0	0	1	0%	0.3	0.5
<i>Antocha sp.</i>	3	2	0	5	10	0%	2.5	2.1
<i>Hexatoma sp.</i>	0	1	1	0	2	0%	0.5	0.6
<i>Simulium (Psilozoa)</i>	0	1007	3	0	1010	18%	252.5	503.0
EPHEMEROPTERA						4%	52	
<i>Baetis tricaudatus</i>	17	125	31	18	191	3%	47.8	51.9
<i>Drunella grandis</i>	3	1	4	3	11	0%	2.8	1.3
<i>Tricorythodes minutus</i>	1	0	0	3	4	0%	1.0	1.4
MEGALOPTERA								
<i>Sialis sp.</i>	0	0	0	1	1	0%	0.3	0.5
PLECOPTERA						8%	118	
<i>Hesperoperla pacifica</i>	0	6	2	0	8	0%	2.0	2.8
<i>Malenka sp.</i>	0	2	0	0	2	0%	0.5	1.0
<i>Skwala parallela</i>	9	7	5	7	28	1%	7.0	1.6
<i>Pteronarcella badia</i>	47	210	76	100	433	8%	108.3	71.2
TRICHOPTERA						50%	703	
<i>Arctopsyche grandis</i>	0	1	1	0	2	0%	0.5	0.6
<i>Cheumatopsyche spp.</i>	2	15	4	6	27	0%	6.8	5.7
<i>Hydropsyche occidentalis</i>	368	1401	483	260	2512	45%	628.0	523.3
<i>Hydropsyche cockerelli</i>	46	109	79	24	258	5%	64.5	37.3
<i>Hydroptila spp.</i>	0	6	0	0	6	0%	1.5	3.0
<i>Ochrotrichia sp.</i>	0	1	0	0	1	0%	0.3	0.5
<i>Lepidostoma sp.</i>	1	0	0	0	1	0%	0.3	0.5
<i>Rhyacophila angelita gp.</i>	0	0	0	1	1	0%	0.3	0.5
<i>Helicopsyche borealis</i>	2	0	1	1	4	0%	1.0	0.8
<i>Glossosoma sp.</i>	1	0	0	0	1	0%	0.3	0.5

MACROINVERTEBRATE DATA								
CLARK FORK RIVER below Warm Springs Cr - STATION 07 -16 AUG 91								
Taxon	sample1	sample2	sample3	sample4	SUM	%RA	MEAN	S. D.
ANNELEIDA						0%	3	
Tubificidae	6	4	0	0	10	0%	2.5	3.0
MOLLUSCA						0%	0	
<i>Gyraulus sp.</i>	0	1	0	0	1	0%	0.3	0.5
TOTAL ORGANISMS	635	3327	893	733	5588		1397	1291
TAXA RICHNESS	22	31	20	22	39		24	4.9
SHAN. DIVERSITY	2.29	2.35	2.21	2.67	2.57		2.38	0.20
BIOTICINDEX	4.71	5.38	4.64	4.52	5.07		4.81	0.39
EPT RICHNESS	11	12	10	10	17		11	1.0
% R.A. DOMINANT	58%	42%	54%	35%	45%		47%	10.7%
% R.A. FILTERERS	66%	76%	64%	40%	68%		61%	15.5%
METALS TOLERANCE	5.04	5.95	5.01	5.31	5.61		5.33	0.43
Baetidae/Ephemeroptera	0.81	0.99	0.89	0.75	0.93		0.86	0.10
Hydropsychinae/Trichoptera	0.99	0.99	1.00	0.99	0.99		0.99	0.00
EPT / (EPT + CHIR.)	0.94	0.97	0.98	0.88	0.95		0.94	0.04
ID's by D. McGuire								

MACROINVERTEBRATE DATA								
CLARK FORK RIVER nr DEMPSEY - STATION 08 - 16 AUG 91								
Taxon	sample1	sample2	sample3	sample4	SUM	%RA	MEAN	S. D.
COLEOPTERA						32%	146	
<i>Optioservus spp.</i>	238	104	92	77	511	28%	127.8	74.3
<i>Zaitzevia sp.</i>	23	18	13	15	69	4%	17.3	4.3
<i>Brychius sp.</i>	0	1	0	0	1	0%	0.3	0.5
<i>Oreodytes spp.</i>	1	0	0	0	1	0%	0.3	0.5
DIPTERA						10%	46	
<i>Thienemannimyia gp.</i>	2	1	0	0	3	0%	0.8	1.0
<i>Pentaneura sp.</i>	0	7	0	2	9	0%	2.3	3.3
<i>Pagastia sp</i>	0	1	2	4	7	0%	1.8	1.7
<i>Eukiefferiella spp.</i>	1	0	0	1	2	0%	0.5	0.6
<i>Paraphaenocladus sp.</i>	1	0	1	1	3	0%	0.8	0.5
<i>Orthocladus sp.</i>	2	0	0	0	2	0%	0.5	1.0
<i>Tvetenia sp.</i>	2	0	0	0	2	0%	0.5	1.0
<i>Cryptochironomus sp.</i>	0	0	1	0	1	0%	0.3	0.5
<i>Polypedilum spp.</i>	12	25	30	43	110	6%	27.5	12.8
<i>Microtendipes sp</i>	7	8	5	1	21	1%	5.3	3.1
<i>Phaenopsectra sp</i>	1	7	6	0	14	1%	3.5	3.5
<i>Hexatoma sp.</i>	0	1	0	0	1	0%	0.3	0.5
<i>Simulium (Psilozoa)</i>	1	0	0	4	5	0%	1.3	1.9
<i>Hemerodromia sp.</i>	1	0	0	1	2	0%	0.5	0.6
<i>Protanyderus sp.</i>	0	0	0	0	0	0%	0.0	0.0
EPHEMEROPTERA						23%	105	
<i>Baetis tricaudatus</i>	14	10	7	25	56	3%	14.0	7.9
<i>Psuedocloeon sp.</i>	2	2	0	2	6	0%	1.5	1.0
<i>Attenella margarita</i>	9	4	2	3	18	1%	4.5	3.1
<i>Tricorythodes minutus</i>	98	199	23	21	341	19%	85.3	83.9
PLECOPTERA						8%	35	
<i>Isogenoides sp.</i>	27	30	9	9	75	4%	18.8	11.3
<i>Skwala parallela</i>	24	16	11	8	59	3%	14.8	7.0
<i>Pteronarcella badia</i>	2	1	1	1	5	0%	1.3	0.5
TRICHOPTERA						28%	129	
<i>Cheumatopsyche spp.</i>	7	1	6	1	15	1%	3.8	3.2
<i>Hydropsyche occidentalis</i>	71	8	74	18	171	9%	42.8	34.6
<i>H. (Ceratopsyche) spp.?</i>	129	35	104	32	300	16%	75.0	49.0
<i>Hydroptila spp.</i>	0	3	2	0	5	0%	1.3	1.5
<i>Ochrotrichia sp.</i>	3	1	0	0	4	0%	1.0	1.4
<i>Oecetis sp.</i>	0	2	1	0	3	0%	0.8	1.0
<i>Helicopsyche borealis</i>	1	3	1	2	7	0%	1.8	1.0
<i>Glossosoma sp.</i>	9	0	1	0	10	1%	2.5	4.4
MOLLUSCA						0%	0	
<i>Sphaeriidae</i>	1	0	0	0	1	0%	0.3	0.5

MACROINVERTEBRATE DATA								
CLARK FORK RIVER nr DEMPSEY - STATION 08 - 16 AUG 91								
Taxon	sample1	sample2	sample3	sample4	SUM	%RA	MEAN	S. D.
TOTAL ORGANISMS	689	488	392	271	1840		460	177
TAXA RICHNESS	27	24	21	21	35		23	2.9
SHAN. DIVERSITY	3.02	2.91	3.03	3.30	3.25		3.06	0.17
BIOTIC INDEX	4.60	4.43	4.87	4.76	4.64		4.67	0.19
EPT RICHNESS	13	14	13	11	15		13	1.3
% R.A. DOMINANT	35%	41%	27%	28%	28%		33%	6.5%
% R.A. FILTERERS	30%	9%	47%	20%	27%		27%	16.1%
METALS TOLERANCE	5.15	4.59	5.35	5.27	5.06		5.09	0.35
Baetidae/Ephemeroptera	0.13	0.06	0.22	0.53	0.15		0.23	0.21
Hydropsychinae/Trichoptera	0.94	0.83	0.97	0.96	0.94		0.93	0.07
EPT / (EPT + CHIR.)	0.93	0.87	0.84	0.70	0.86		0.84	0.10
ID's by D. McGuire								

MACROINVERTEBRATE DATA								
CLARK FORK RIVER @ SAGER LANE - STATION 08.5 - 14 AUG 91								
Taxon	sample1	sample2	sample3	sample4	SUM	%RA	MEAN	S. D.
COLEOPTERA						14%	118	
<i>Optioservus</i> spp.	68	97	19	242	426	13%	106.5	95.9
<i>Zaitzevia</i> sp.	5	13	3	20	41	1%	10.3	7.8
<i>Cleptelmis ornata</i>	0	1	0	0	1	0%	0.3	0.5
<i>Oreodytes</i> spp.	0	2	0	0	2	0%	0.5	1.0
DIPTERA						18%	151	
<i>Thienemannimyia</i> gp.	1	3	3	2	9	0%	2.3	1.0
<i>Pentaneura</i> sp.	9	12	0	4	25	1%	6.3	5.3
<i>Pagastia</i> sp.	0	0	0	2	2	0%	0.5	1.0
<i>Cricotopus</i> spp.	4	11	8	4	27	1%	6.8	3.4
<i>Orthocladius</i> spp.	0	1	0	0	1	0%	0.3	0.5
<i>Paraphaenocladus</i> sp.	0	1	0	5	6	0%	1.5	2.4
<i>Nanocladius</i> sp.	0	1	0	0	1	0%	0.3	0.5
<i>Thienemanniella</i> sp.	1	0	0	0	1	0%	0.3	0.5
<i>Tvetenia</i> sp.	1	0	0	0	1	0%	0.3	0.5
<i>Cryptochironomus</i> sp.	0	0	0	1	1	0%	0.3	0.5
<i>Polypedilum</i> spp.	50	187	55	154	446	13%	111.5	69.5
<i>Microtendipes</i> sp.	11	13	6	14	44	1%	11.0	3.6
<i>Phaenopsectra</i> sp.	2	9	6	6	23	1%	5.8	2.9
<i>Antocha</i> sp.	2	8	0	2	12	0%	3.0	3.5
<i>Hexatoma</i> sp.	1	0	3	1	5	0%	1.3	1.3
<i>Simulium</i> (Psilozoa)	0	0	1	0	1	0%	0.3	0.5
EPHEMEROPTERA						25%	211	
<i>Baetis tricaudatus</i>	36	53	90	140	319	9%	79.8	46.1
<i>Psuedocloeon</i> sp.	2	13	2	11	28	1%	7.0	5.8
<i>Attenella margarita</i>	7	20	1	2	30	1%	7.5	8.7
<i>Tricorythodes minutus</i>	100	224	64	79	467	14%	116.8	73.0
LEPIDOPTERA								
<i>Petrophila</i> sp.	0	1	0	0	1	0%	0.3	0.5
PLECOPTERA						11%	92	
<i>Isogenoides</i> sp.	29	89	26	53	197	6%	49.3	29.1
<i>Skwala parallela</i>	32	33	36	57	158	5%	39.5	11.8
<i>Pteronarcella badia</i>	1	2	0	7	10	0%	2.5	3.1
<i>Isoperla fulva</i>	2	0	0	1	3	0%	0.8	1.0
Chloroperlinae	0	0	1	0	1	0%	0.3	0.5

MACROINVERTEBRATE DATA								
CLARK FORK RIVER @ SAGER LANE - STATION 08.5 - 14 AUG 91								
Taxon	sample1	sample2	sample3	sample4	SUM	%RA	MEAN	S. D.
TRICHOPTERA						31%	261	
<i>Cheumatopsyche</i> spp.	4	3	4	6	17	1%	4.3	1.3
<i>Hydropsyche occidentalis</i>	28	45	54	107	234	7%	58.5	34.1
<i>H. (Ceratopsyche) spp.?</i>	51	85	33	192	361	11%	90.3	71.2
<i>Hydroptila</i> spp.	7	46	8	9	70	2%	17.5	19.0
<i>Ochrotrichia</i> sp.	18	169	84	41	312	9%	78.0	66.5
<i>Oecetis</i> sp.	6	25	4	4	39	1%	9.8	10.2
<i>Helicopsyche borealis</i>	2	1	0	0	3	0%	0.8	1.0
<i>Glossosoma</i> sp.	2	5	0	1	8	0%	2.0	2.2
ANNELIDA						1%	7	
Tubificidae	0	7	7	12	26	1%	6.5	4.9
TOTAL ORGANISMS	482	1180	518	1179	3359		840	393
TAXA RICHNESS	28	31	23	29	39		28	3.4
SHAN. DIVERSITY	3.71	3.71	3.57	3.50	3.77		3.62	0.11
BIOTIC INDEX	4.56	4.68	4.55	4.78	4.68		4.64	0.11
EPT RICHNESS	16	15	13	15	17		15	1.3
% R.A. DOMINANT	21%	19%	17%	21%	14%		19%	1.6%
% R.A. FILTERERS	17%	11%	18%	26%	18%		18%	6.0%
METALS TOLERANCE	4.59	4.46	4.59	5.05	4.71		4.67	0.26
Baetidae/Ephemeroptera	0.26	0.21	0.59	0.65	0.41		0.43	0.22
Hydropsychinae/Trichoptera	0.70	0.35	0.49	0.85	0.59		0.60	0.22
EPT / (EPT + CHIR.)	0.81	0.77	0.84	0.79	0.79		0.80	0.03
ID's by D. McGuire								

MACROINVERTEBRATE DATA								
CLARK FORK RIVER @ DEERLODGE - STATION 09 - 14 AUG 91								
Taxon	sample1	sample2	sample3	sample4	SUM	%RA	MEAN	S. D.
COLEOPTERA						6%	59	
<i>Optioservus spp.</i>	54	26	42	35	157	4%	39.3	11.8
<i>Zaitzevia sp.</i>	45	7	15	10	77	2%	19.3	17.5
<i>Haliphus sp.</i>	1	0	0	0	1	0%	0.3	0.5
DIPTERA						10%	92	
<i>Pentaneura sp.</i>	2	3	0	1	6	0%	1.5	1.3
<i>Pagastia sp.</i>	0	1	0	0	1	0%	0.3	0.5
<i>Cardiocladius spp.</i>	0	0	1	0	1	0%	0.3	0.5
<i>Cricotopus spp.</i>	1	0	2	2	5	0%	1.3	1.0
<i>Cricotopus nostococladius</i>	0	0	1	0	1	0%	0.3	0.5
<i>Eukiefferiella spp.</i>	1	1	1	1	4	0%	1.0	0.0
<i>Paraphaenocladius sp.</i>	6	1	3	1	11	0%	2.8	2.4
<i>Tvetenia sp.</i>	0	2	3	0	5	0%	1.3	1.5
<i>Polypedilum spp.</i>	40	69	67	42	218	6%	54.5	15.6
<i>Microtendipes sp.</i>	0	1	0	0	1	0%	0.3	0.5
<i>Phaenopsectra sp.</i>	5	2	2	2	11	0%	2.8	1.5
<i>Antocha sp.</i>	1	3	0	0	4	0%	1.0	1.4
<i>Hexatoma sp.</i>	0	0	0	1	1	0%	0.3	0.5
<i>Tipula sp.</i>	2	0	4	1	7	0%	1.8	1.7
<i>Simulium (Psilozoa)</i>	5	4	25	53	87	2%	21.8	23.0
<i>Clinocera sp.</i>	3	1	0	0	4	0%	1.0	1.4
<i>Limnophora sp.</i>	0	0	0	2	2	0%	0.5	1.0
EPHEMEROPTERA						7%	61	
<i>Acentrella insignificans</i>	1	1	0	0	2	0%	0.5	0.6
<i>Baetis tricaudatus</i>	90	23	19	32	164	5%	41.0	33.1
<i>Psuedocloeon sp.</i>	0	2	0	5	7	0%	1.8	2.4
<i>Attenella margarita</i>	0	3	1	2	6	0%	1.5	1.3
<i>Tricorythodes minutus</i>	12	35	2	16	65	2%	16.3	13.8
PLECOPTERA						5%	49	
<i>Isogenoides sp.</i>	43	33	43	28	147	4%	36.8	7.5
<i>Skwala parallela</i>	17	5	6	8	36	1%	9.0	5.5
<i>Pteronarcella badia</i>	12	0	2	0	14	0%	3.5	5.7
TRICHOPTERA						71%	646	
<i>Cheumatopsyche spp.</i>	35	9	2	1	47	1%	11.8	15.9
<i>Hydropsyche occidentalis</i>	802	239	341	270	1652	45%	413.0	262.8
<i>Hydropsyche cockerelli</i>	96	24	78	7	205	6%	51.3	42.5
<i>Hydroptila spp.</i>	3	46	8	30	87	2%	21.8	20.0
<i>Ochrotrichia sp.</i>	45	216	65	139	465	13%	116.3	77.8
<i>Oecetis sp.</i>	12	28	2	30	72	2%	18.0	13.4
<i>Nectopsyche sp.</i>	1	2	1	2	6	0%	1.5	0.6
<i>Helicopsyche borealis</i>	0	3	0	15	18	0%	4.5	7.1
<i>Glossosoma sp.</i>	4	4	23	0	31	1%	7.8	10.3

MACROINVERTEBRATE DATA								
CLARK FORK RIVER @ DEERLODGE - STATION 09 - 14 AUG 91								
Taxon	sample1	sample2	sample3	sample4	SUM	%RA	MEAN	S. D.
ANNELEIDA						0%	1	
Tubificidae	0	1	0	2	3	0%	0.8	1.0
OTHER								0.0
Turbellaria	0	0	6	0	6	0%	1.5	3.0
TOTAL ORGANISMS	1339	795	765	738	3637		909	287
TAXA RICHNESS	27	30	27	27	39		28	1.5
SHAN. DIVERSITY	2.44	3.15	2.96	3.17	3.07		2.93	0.34
BIOTIC INDEX	4.73	4.74	4.65	4.97	4.77		4.77	0.14
EPT RICHNESS	14	16	14	14	17		15	1.0
% R.A. DOMINANT	60%	30%	45%	37%	45%		43%	12.9%
% R.A. FILTERERS	70%	35%	58%	45%	55%		52%	15.4%
METALS TOLERANCE	4.85	4.51	4.68	4.88	4.75		4.73	0.17
Baetidae/Ephemeroptera	0.88	0.41	0.86	0.67	0.71		0.71	0.22
Hydropsychinae/Trichoptera	0.93	0.48	0.81	0.56	0.74		0.70	0.21
EPT / (EPT + CHIR.)	0.96	0.89	0.88	0.92	0.92		0.91	0.03
ID's by D. McGuire								

MACROINVERTEBRATE DATA								
CLARK FORK RIVER above L. Blackfoot R. - STATION 10 - 14 AUG 91								
Taxon	sample1	sample2	sample3	sample4	SUM	%RA	MEAN	S. D.
COLEOPTERA						5%	76	
<i>Optioservus spp.</i>	18	8	20	186	232	4%	58.0	85.5
<i>Zaitzevia sp.</i>	28	9	9	25	71	1%	17.8	10.2
DIPTERA						21%	347	
<i>Thienemannimyia gp.</i>	0	0	1	10	11	0%	2.8	4.9
<i>Pentaneura sp.</i>	3	0	7	83	93	1%	23.3	39.9
<i>Corynoneura sp</i>	0	0	3	0	3	0%	0.8	1.5
<i>Cricotopus spp.</i>	6	17	8	0	31	0%	7.8	7.0
<i>Tvetenia sp.</i>	1	0	3	0	4	0%	1.0	1.4
<i>Polypedilum spp.</i>	28	16	65	31	140	2%	35.0	21.0
<i>Microtendipes sp</i>	8	0	0	70	78	1%	19.5	33.9
<i>Phaenopsectra sp</i>	0	13	43	81	137	2%	34.3	36.0
<i>Micropsectra spp.</i>	0	0	3	0	3	0%	0.8	1.5
<i>Hexatoma sp.</i>	2	20	19	0	41	1%	10.3	10.7
<i>Tipula sp.</i>	0	0	1	0	1	0%	0.3	0.5
<i>Ceratopogoninae</i>	0	0	0	10	10	0%	2.5	5.0
<i>Simulium (Psilozoa)</i>	72	83	47	623	825	13%	206.3	278.2
<i>Hemerodromia sp.</i>	0	0	0	10	10	0%	2.5	5.0
EPHEMEROPTERA						45%	722	
<i>Acentrella insignificans</i>	1	1	0	0	2	0%	0.5	0.6
<i>Baetis tricaudatus</i>	18	27	32	52	129	2%	32.3	14.4
<i>Psuedocloeon sp.</i>	5	20	18	40	83	1%	20.8	14.5
<i>Attenella margarita</i>	13	18	23	0	54	1%	13.5	9.9
<i>Nixe sp.</i>	6	0	3	0	9	0%	2.3	2.9
<i>Tricorythodes minutus</i>	203	347	371	1690	2611	40%	652.8	695.5
ODONATA								
<i>Ophiogomphus sp.</i>	1	0	3	0	4	0%	1.0	1.4
PLECOPTERA						2%	39	
<i>Isogenoides sp.</i>	25	30	30	63	148	2%	37.0	17.5
<i>Skwala parallela</i>	0	2	1	2	5	0%	1.3	1.0
<i>Pteronarcella badia</i>	0	0	0	1	1	0%	0.3	0.5
<i>Chloroperlinae</i>	0	2	0	1	3	0%	0.8	1.0

MACROINVERTEBRATE DATA								
CLARK FORK RIVER above L. Blackfoot R. - STATION 10 - 14 AUG 91								
Taxon	sample1	sample2	sample3	sample4	SUM	%RA	MEAN	S. D.
TRICHOPTERA						24%	393	
<i>Cheumatopsyche</i> spp.	42	16	12	42	112	2%	28.0	16.2
<i>Hydropsyche occidentalis</i>	64	34	220	10	328	5%	82.0	94.6
<i>Hydropsyche cockerelli</i>	71	20	59	21	171	3%	42.8	26.2
<i>Hydroptila</i> spp.	12	50	78	303	443	7%	110.8	131.0
<i>Ochrotrichia</i> sp.	28	36	49	166	279	4%	69.8	64.7
<i>Oecetis</i> sp.	29	32	39	105	205	3%	51.3	36.1
<i>Brachycentrus occidentalis</i>	0	3	0	1	4	0%	1.0	1.4
<i>Helicopsyche borealis</i>	6	12	6	0	24	0%	6.0	4.9
<i>Protophila</i> sp.	2	0	3	0	5	0%	1.3	1.5
ANNELIDA						2%	37	
Tubificidae	0	3	4	141	148	2%	37.0	69.4
Erpobdellidae	0	0	0	1	1	0%	0.3	0.5
TOTAL ORGANISMS	692	819	1180	3768	6459		1615	1450
TAXA RICHNESS	25	24	30	26	38		26	2.6
SHAN. DIVERSITY	3.60	3.30	3.51	2.90	3.36		3.33	0.31
BIOTIC INDEX	4.77	4.73	4.82	5.23	5.05		4.89	0.23
EPT RICHNESS	15	16	15	14	19		15	0.8
% R.A. DOMINANT	29%	42%	31%	45%	40%		37%	7.7%
% R.A. FILTERERS	36%	19%	29%	18%	22%		26%	8.4%
METALS TOLERANCE	4.75	4.61	4.48	4.97	4.81		4.70	0.21
Baetidae/Ephemeroptera	0.10	0.12	0.11	0.05	0.07		0.09	0.03
Hydropsychinae/Trichoptera	0.70	0.34	0.62	0.11	0.39		0.44	0.27
EPT / (EPT + CHIR.)	0.92	0.93	0.88	0.90	0.90		0.91	0.02
ID's by D. McGuire								

MACROINVERTEBRATE DATA								
CLARK FORK RIVER @ GOLD CREEK - STATION 11 - 14 AUG 91								
Taxon	sample1	sample2	sample3	sample4	SUM	%RA	MEAN	S. D.
COLEOPTERA						4%	64	
<i>Optioservus spp.</i>	2	66	19	49	136	2%	34.0	28.9
<i>Zaitzevia sp.</i>	14	20	15	69	118	2%	29.5	26.5
DIPTERA						31%	455	
<i>Thienemannimyia gp.</i>	1	16	2	3	22	0%	5.5	7.0
<i>Pentaneura sp.</i>	0	16	1	4	21	0%	5.3	7.4
<i>Pagastia sp</i>	1	0	0	3	4	0%	1.0	1.4
<i>Cardiocladius spp.</i>	0	0	0	1	1	0%	0.3	0.5
<i>Cricotopus spp.</i>	1	107	15	15	138	2%	34.5	48.8
<i>Eukiefferiella spp.</i>	0	25	0	5	30	1%	7.5	11.9
<i>Orthocladius spp.</i>	0	10	1	3	14	0%	3.5	4.5
<i>Parametriocnemus sp.</i>	0	1	0	2	3	0%	0.8	1.0
<i>Tvetenia sp.</i>	1	53	4	9	67	1%	16.8	24.4
<i>Polypedilum spp.</i>	26	316	8	43	393	7%	98.3	145.9
<i>Microtendipes sp</i>	1	56	1	14	72	1%	18.0	26.1
<i>Phaenopsectra sp</i>	0	0	0	6	6	0%	1.5	3.0
<i>Micropsectra spp.</i>	0	0	1	5	6	0%	1.5	2.4
<i>Antocha sp.</i>	0	10	0	6	16	0%	4.0	4.9
<i>Hexatoma sp.</i>	20	1	4	6	31	1%	7.8	8.4
<i>Tipula sp.</i>	1	0	0	0	1	0%	0.3	0.5
<i>Ceratopogoninae</i>	0	1	0	0	1	0%	0.3	0.5
<i>Simulium (Psilozoa)</i>	132	662	73	124	991	17%	247.8	277.4
<i>Hemerodromia sp.</i>	0	0	1	0	1	0%	0.3	0.5
EPHEMEROPTERA						39%	569	
<i>Acentrella insignificans</i>	5	11	7	1	24	0%	6.0	4.2
<i>Baetis tricaudatus</i>	13	135	26	28	202	3%	50.5	56.7
<i>Psuedocloeon sp.</i>	1	71	12	2	86	1%	21.5	33.4
<i>Attenella margarita</i>	17	11	7	36	71	1%	17.8	12.8
<i>Ephemerella inermis</i>	0	0	0	3	3	0%	0.8	1.5
<i>Drunella grandis</i>	0	0	0	4	4	0%	1.0	2.0
<i>Heptagenia soltari</i>	6	0	0	0	6	0%	1.5	3.0
<i>Nixe sp.</i>	12	0	2	2	16	0%	4.0	5.4
<i>Rhithrogena sp.</i>	3	0	5	3	11	0%	2.8	2.1
<i>Tricorythodes minutus</i>	178	1498	83	92	1851	32%	462.8	691.5
HEMIPTERA								
<i>Rhagovelia sp.</i>	0	0	1	0	1	0%	0.3	0.5
LEPIDOPTERA								
<i>Petrophila sp.</i>	0	5	0	0	5	0%	1.3	2.5

MACROINVERTEBRATE DATA								
CLARK FORK RIVER @ GOLD CREEK - STATION 11 - 14 AUG 91								
Taxon	sample1	sample2	sample3	sample4	SUM	%RA	MEAN	S. D.
PLECOPTERA						2%	22	
<i>Claassenia sabulosa</i>	1	0	0	6	7	0%	1.8	2.9
<i>Hesperoperla pacifica</i>	0	0	0	2	2	0%	0.5	1.0
<i>Isogenoides sp.</i>	9	21	5	36	71	1%	17.8	13.9
<i>Skwala parallela</i>	1	0	0	0	1	0%	0.3	0.5
<i>Pteronarcella badia</i>	0	1	0	0	1	0%	0.3	0.5
<i>Isoperla fulva</i>	0	0	2	3	5	0%	1.3	1.5
TRICHOPTERA						23%	334	
<i>Arctopsyche grandis</i>	0	0	0	2	2	0%	0.5	1.0
<i>Cheumatopsyche spp.</i>	14	46	5	38	103	2%	25.8	19.4
<i>Hydropsyche occidentalis</i>	26	96	3	196	321	6%	80.3	86.7
<i>Hydropsyche cockerelli</i>	21	91	11	117	240	4%	60.0	52.1
<i>Hydroptila spp.</i>	8	250	14	14	286	5%	71.5	119.0
<i>Ochrotrichia sp.</i>	8	213	0	15	236	4%	59.0	102.8
<i>Lepidostoma sp.</i>	0	0	1	0	1	0%	0.3	0.5
<i>Oecetis sp.</i>	12	75	5	6	98	2%	24.5	33.8
<i>Brachycentrus occidentalis</i>	0	1	2	0	3	0%	0.8	1.0
<i>Helicopsyche borealis</i>	3	25	2	11	41	1%	10.3	10.6
<i>Protophila sp.</i>	0	0	1	0	1	0%	0.3	0.5
<i>Glossosoma sp.</i>	0	0	1	2	3	0%	0.8	1.0
ANNELIDA						0%	2	
Lumbricidae	1	0	0	0	1	0%	0.3	0.5
Tubificidae	0	0	0	8	8	0%	2.0	4.0
TOTAL ORGANISMS	539	3910	340	994	5783		1446	1665
TAXA RICHNESS	30	31	33	41	53		34	5.0
SHAN. DIVERSITY	3.31	3.22	3.77	4.05	3.64		3.59	0.39
BIOTICINDEX	4.88	5.11	4.99	4.83	5.04		4.96	0.12
EPT RICHNESS	18	15	19	22	28		19	2.9
% R.A. DOMINANT	33%	38%	24%	20%	32%		29%	8.4%
% R.A. FILTERERS	36%	23%	28%	48%	29%		34%	11.0%
METALS TOLERANCE	4.94	5.14	5.29	5.08	5.12		5.11	0.15
Baetidae/Ephemeroptera	0.08	0.13	0.32	0.18	0.14		0.18	0.10
Hydropsychinae/Trichoptera	0.66	0.29	0.42	0.88	0.50		0.56	0.26
EPT / (EPT + CHIR.)	0.92	0.81	0.85	0.85	0.83		0.86	0.04
ID's by D. McGuire								

MACROINVERTEBRATE DATA								
CLARK FORK RIVER @ BONITA - STATION 12 - 12 AUG 91								
Taxon	sample1	sample2	sample3	sample4	SUM	%RA	MEAN	S. D.
COLEOPTERA						4%	133	
<i>Optioservus spp.</i>	51	60	27	31	169	1%	42.3	15.8
<i>Zaitzevia sp.</i>	57	117	77	111	362	3%	90.5	28.4
<i>Microcylloepus sp.</i>	0	0	1	0	1	0%	0.3	0.5
DIPTERA						16%	490	
<i>Thienemannimyia gp.</i>	2	11	6	2	21	0%	5.3	4.3
<i>Pentaneura sp.</i>	0	1	1	2	4	0%	1.0	0.8
<i>Pagastia sp</i>	0	0	1	1	2	0%	0.5	0.6
<i>Cardiocladius spp.</i>	9	7	13	20	49	0%	12.3	5.7
<i>Cricotopus spp.</i>	4	21	13	16	54	0%	13.5	7.1
<i>Eukiefferiella spp.</i>	19	13	1	5	38	0%	9.5	8.1
<i>Eukiefferiella devonica gp.</i>	22	18	5	8	53	0%	13.3	8.1
<i>Orthocladius spp.</i>	1	6	4	7	18	0%	4.5	2.6
<i>Tvetenia sp.</i>	32	40	16	59	147	1%	36.8	17.9
<i>Demicryptochironomus sp.</i>	0	0	0	1	1	0%	0.3	0.5
<i>Polypedilum spp.</i>	128	206	85	185	604	5%	151.0	55.0
<i>Microtendipes sp</i>	0	5	0	1	6	0%	1.5	2.4
<i>Phaenopsectra sp</i>	4	21	5	0	30	0%	7.5	9.3
<i>Micropsectra spp.</i>	3	5	0	11	19	0%	4.8	4.6
<i>Antocha sp.</i>	0	0	3	6	9	0%	2.3	2.9
<i>Hexatoma sp.</i>	2	4	5	3	14	0%	3.5	1.3
<i>Atherix pachypus</i>	3	1	6	2	12	0%	3.0	2.2
<i>Simulium (Psilozoa)</i>	155	452	177	86	870	7%	217.5	161.1
<i>Hemerodromia sp.</i>	1	2	2	5	10	0%	2.5	1.7
EPHEMEROPTERA						8%	253	
<i>Acentrella insignificans</i>	4	2	11	41	58	0%	14.5	18.1
<i>Baetis tricaudatus</i>	176	313	159	204	852	7%	213.0	69.2
<i>Psuedocloeon sp.</i>	1	3	4	12	20	0%	5.0	4.8
<i>Attenella margarita</i>	0	0	2	6	8	0%	2.0	2.8
<i>Serratella tibialis</i>	1	2	3	7	13	0%	3.3	2.6
<i>Drunella grandis</i>	2	0	3	6	11	0%	2.8	2.5
<i>Heptagenia soltari</i>	0	0	1	1	2	0%	0.5	0.6
<i>Rhithrogena sp.</i>	10	5	8	0	23	0%	5.8	4.3
<i>Tricorythodes minutus</i>	0	5	8	11	24	0%	6.0	4.7
LEPIDOPTERA								
<i>Petrophila sp.</i>	0	0	7	8	15	0%	3.8	4.3
PLECOPTERA						1%	46	
<i>Claassenia sabulosa</i>	8	3	13	7	31	0%	7.8	4.1
<i>Hesperoperla pacifica</i>	0	0	1	0	1	0%	0.3	0.5
<i>Isogenoides sp.</i>	41	37	33	36	147	1%	36.8	3.3
<i>Pteronarcella badia</i>	2	0	0	0	2	0%	0.5	1.0
<i>Pteronarcys californica</i>	0	0	0	1	1	0%	0.3	0.5

MACROINVERTEBRATE DATA								
CLARK FORK RIVER @ BONITA - STATION 12 - 12 AUG 91								
Taxon	sample1	sample2	sample3	sample4	SUM	%RA	MEAN	S. D.
TRICHOPTERA						71%	2227	
<i>Arctopsyche grandis</i>	2	2	1	2	7	0%	1.8	0.5
<i>Cheumatopsyche spp.</i>	15	18	28	34	95	1%	23.8	8.8
<i>Hydropsyche occidentalis</i>	2002	2720	1100	2510	8332	66%	2083.0	721.3
<i>Hydropsyche cockerelli</i>	13	49	33	39	134	1%	33.5	15.2
<i>Hydroptila spp.</i>	30	0	20	7	57	0%	14.3	13.4
<i>Neotrichia sp.</i>	0	0	1	0	1	0%	0.3	0.5
<i>Ochrotrichia sp.</i>	87	77	72	33	269	2%	67.3	23.7
<i>Oecetis sp.</i>	0	0	1	5	6	0%	1.5	2.4
<i>Brachycentrus occidentalis</i>	0	1	2	3	6	0%	1.5	1.3
ANNELIDA						0%	0	
Tubificidae	0	0	1	0	1	0%	0.3	0.5
OTHER								0.0
Turbellaria	2	0	0	0	2	0%	0.5	1.0
TOTAL ORGANISMS	2889	4227	1960	3535	12611		3153	965
TAXA RICHNESS	32	32	42	40	48		37	5.3
SHAN. DIVERSITY	2.01	2.10	2.69	2.01	2.20		2.20	0.33
BIOTIC INDEX	5.03	5.14	4.98	4.96	5.04		5.03	0.08
EPT RICHNESS	15	14	21	19	23		17	3.3
% R.A. DOMINANT	69%	64%	56%	71%	66%		65%	6.7%
% R.A. FILTERERS	76%	77%	68%	76%	75%		74%	3.8%
METALS TOLERANCE	5.14	5.33	5.22	5.06	5.19		5.19	0.12
Baetidae/Ephemeroptera	0.93	0.96	0.87	0.89	0.92		0.92	0.04
Hydropsychinae/Trichoptera	0.94	0.97	0.92	0.98	0.96		0.96	0.03
EPT / (EPT + CHIR.)	0.91	0.90	0.91	0.90	0.91		0.91	0.01
ID's by D. McGuire								

MACROINVERTEBRATE DATA								
CLARK FORK RIVER @ TURAH - STATION 13 - 13 AUG 91								
Taxon	sample1	sample2	sample3	sample4	SUM	%RA	MEAN	S. D.
COLEOPTERA						5%	106	
<i>Optioservus spp.</i>	42	56	48	36	182	2%	45.5	8.5
<i>Zaitzevia sp.</i>	71	58	38	68	235	3%	58.8	14.9
<i>Narpus concolor</i>	3	1	1	0	5	0%	1.3	1.3
DIPTERA						41%	881	
<i>Thienemannimyia gp.</i>	3	19	2	1	25	0%	6.3	8.5
<i>Pentaneura sp.</i>	0	5	1	1	7	0%	1.8	2.2
<i>Pagastia sp</i>	10	4	2	6	22	0%	5.5	3.4
<i>Cardiocladius spp.</i>	0	3	6	9	18	0%	4.5	3.9
<i>Corynoneura sp</i>	0	1	0	0	1	0%	0.3	0.5
<i>Cricotopus spp.</i>	239	294	85	125	743	9%	185.8	97.3
<i>Cricotopus nostococladus</i>	1	0	0	1	2	0%	0.5	0.6
<i>Eukiefferiella spp.</i>	15	99	27	19	160	2%	40.0	39.6
<i>Eukiefferiella devonica gp.</i>	30	190	56	35	311	4%	77.8	75.7
<i>Orthocladus spp.</i>	13	0	0	0	13	0%	3.3	6.5
<i>Parametriocnemus sp.</i>	0	1	1	0	2	0%	0.5	0.6
<i>Paraphaenocladus sp.</i>	1	2	3	0	6	0%	1.5	1.3
<i>Synorthocladus sp.</i>	0	0	0	1	1	0%	0.3	0.5
<i>Tvetenia sp.</i>	39	113	46	61	259	3%	64.8	33.5
<i>Rheocricotopus sp.</i>	1	0	0	0	1	0%	0.3	0.5
<i>Cryptochironomus sp.</i>	1	0	0	0	1	0%	0.3	0.5
<i>Polypedilum spp.</i>	176	565	243	137	1121	13%	280.3	194.8
<i>Microtendipes sp</i>	15	25	21	28	89	1%	22.3	5.6
<i>Phaenopsectra sp</i>	2	2	10	3	17	0%	4.3	3.9
<i>Rheotanytarsus sp.</i>	8	33	2	5	48	1%	12.0	14.2
<i>Micropsectra spp.</i>	18	53	19	12	102	1%	25.5	18.6
<i>Antocha sp.</i>	2	8	1	6	17	0%	4.3	3.3
<i>Hexatoma sp.</i>	19	16	7	13	55	1%	13.8	5.1
<i>Ceratopogoninae</i>	0	0	0	1	1	0%	0.3	0.5
<i>Atherix pachypus</i>	3	2	3	5	13	0%	3.3	1.3
<i>Simulium (Eusimulium)</i>	129	251	42	62	484	6%	121.0	94.3
<i>Hemerodromia sp.</i>	0	5	0	0	5	0%	1.3	2.5
EPHEMEROPTERA						17%	378	
<i>Acentrella insignificans</i>	6	31	49	26	112	1%	28.0	17.7
<i>Baetis tricaudatus</i>	100	250	102	42	494	6%	123.5	88.8
<i>Psuedocloeon sp.</i>	1	3	0	0	4	0%	1.0	1.4
<i>Attenella margarita</i>	7	38	17	9	71	1%	17.8	14.2
<i>Serratella tibialis</i>	10	10	5	3	28	0%	7.0	3.6
<i>Ephemerella inermis</i>	4	0	0	0	4	0%	1.0	2.0
<i>Drunella grandis</i>	52	128	54	69	303	4%	75.8	35.6
<i>Heptagenia soltari</i>	2	0	1	1	4	0%	1.0	0.8
<i>Nixe sp.</i>	1	3	3	3	10	0%	2.5	1.0
<i>Rhithrogena sp.</i>	10	20	6	9	45	1%	11.3	6.1
<i>Paraleptophlebia bicornuta</i>	0	1	0	3	4	0%	1.0	1.4
<i>Tricorythodes minutus</i>	61	235	63	72	431	5%	107.8	85.0

MACROINVERTEBRATE DATA								
CLARK FORK RIVER @ TURAHA - STATION 13 - 13 AUG 91								
Taxon	sample1	sample2	sample3	sample4	SUM	%RA	MEAN	S. D.
LEPIDOPTERA								
<i>Petrophila</i> sp.	2	2	0	2	6	0%	1.5	1.0
PLECOPTERA						2%	44	
<i>Claassenia sabulosa</i>	3	7	1	3	14	0%	3.5	2.5
<i>Hesperoperla pacifica</i>	1	2	0	0	3	0%	0.8	1.0
<i>Isogenoides</i> sp.	9	10	15	16	50	1%	12.5	3.5
<i>Skwala parallela</i>	2	4	2	0	8	0%	2.0	1.6
<i>Pteronarcella badia</i>	18	21	3	6	48	1%	12.0	8.8
<i>Pteronarcys californica</i>	4	7	0	6	17	0%	4.3	3.1
<i>Isoperla fulva</i>	1	29	1	1	32	0%	8.0	14.0
Chloroperlinae	1	1	0	1	3	0%	0.8	0.5
TRICHOPTERA						35%	752	
<i>Arctopsyche grandis</i>	18	17	4	24	63	1%	15.8	8.4
<i>Cheumatopsyche</i> spp.	30	58	12	36	136	2%	34.0	19.0
<i>Hydropsyche occidentalis</i>	416	568	556	352	1892	22%	473.0	106.2
<i>Hydropsyche cockerelli</i>	29	66	24	81	200	2%	50.0	27.9
<i>Hydroptila</i> spp.	49	130	59	135	373	4%	93.3	45.6
<i>Neotrichia</i> sp.	0	0	0	1	1	0%	0.3	0.5
<i>Ochrotrichia</i> sp.	51	115	28	65	259	3%	64.8	36.8
<i>Dicosmoecus</i> sp.	1	0	0	0	1	0%	0.3	0.5
<i>Oecetis</i> sp.	7	36	11	12	66	1%	16.5	13.2
<i>Brachycentrus occidentalis</i>	2	1	2	8	13	0%	3.3	3.2
<i>Helicopsyche borealis</i>	0	2	0	0	2	0%	0.5	1.0
ANNELIDA						0%	2	
Naididae	0	0	0	1	1	0%	0.3	0.5
Tubificidae	0	5	0	1	6	0%	1.5	2.4
OTHER								0.0
Turbellaria	1	3	0	0	4	0%	1.0	1.4
TOTAL ORGANISMS	1740	3609	1682	1623	8654		2164	965
TAXA RICHNESS	53	54	44	50	65		50	4.5
SHAN. DIVERSITY	4.07	4.24	3.76	4.30	4.22		4.09	0.24
BIOTICINDEX	5.02	5.17	5.07	4.91	5.07		5.04	0.11
EPT RICHNESS	28	27	22	25	31		26	2.6
% R.A. DOMINANT	24%	16%	33%	22%	22%		24%	7.2%
% R.A. FILTERERS	36%	28%	38%	35%	33%		34%	4.7%
METALS TOLERANCE	5.41	5.07	5.02	5.01	5.12		5.13	0.19
Baetidae/Ephemeroptera	0.42	0.39	0.50	0.29	0.40		0.40	0.09
Hydropsychinae/Trichoptera	0.79	0.70	0.85	0.66	0.74		0.75	0.09
EPT / (EPT + CHIR.)	0.61	0.56	0.66	0.69	0.61		0.63	0.06
ID's by D. McGuire								

MACROINVERTEBRATE DATA								
BLACKFOOT RIVER nr mouth - STATION 14 - 13 AUG 91								
Taxon	sample1	sample2	sample3	sample4	SUM	%RA	MEAN	S. D.
COLEOPTERA						16%	27	
<i>Optioservus spp.</i>	18	8	7	8	41	6%	10.3	5.2
<i>Zaitzevia sp.</i>	2	23	12	28	65	10%	16.3	11.6
DIPTERA						11%	19	
<i>Corynoneura sp</i>	4	0	0	0	4	1%	1.0	2.0
<i>Cricotopus spp.</i>	2	0	0	1	3	0%	0.8	1.0
<i>Eukiefferiella spp.</i>	0	1	0	0	1	0%	0.3	0.5
<i>Tvetenia sp.</i>	1	0	0	0	1	0%	0.3	0.5
<i>Polypedilum spp.</i>	15	4	1	1	21	3%	5.3	6.7
<i>Microtendipes sp</i>	6	0	2	0	8	1%	2.0	2.8
<i>Rheotanytarsus sp.</i>	2	0	0	0	2	0%	0.5	1.0
<i>Tanytarsus sp.</i>	1	0	0	0	1	0%	0.3	0.5
<i>Micropsectra spp.</i>	8	3	2	3	16	2%	4.0	2.7
<i>Antocha sp.</i>	1	0	0	1	2	0%	0.5	0.6
<i>Hexatoma sp.</i>	1	2	6	2	11	2%	2.8	2.2
<i>Atherix pachypus</i>	0	1	0	0	1	0%	0.3	0.5
<i>Simulium (Eusimulium)</i>	1	0	0	2	3	0%	0.8	1.0
EPHEMEROPTERA						29%	49	
<i>Acentrella insignificans</i>	0	0	0	4	4	1%	1.0	2.0
<i>Baetis tricaudatus</i>	23	15	13	12	63	9%	15.8	5.0
<i>Baetis bicaudatus</i>	0	10	4	7	21	3%	5.3	4.3
<i>Attenella margarita</i>	0	1	0	0	1	0%	0.3	0.5
<i>Serratella tibialis</i>	3	18	17	16	54	8%	13.5	7.0
<i>Drunella doddsi</i>	1	0	2	3	6	1%	1.5	1.3
<i>Drunella grandis</i>	0	6	0	7	13	2%	3.3	3.8
<i>Epeorus albertae</i>	4	8	7	3	22	3%	5.5	2.4
<i>Nixe sp.</i>	0	0	0	1	1	0%	0.3	0.5
<i>Rhithrogena sp.</i>	2	4	1	3	10	1%	2.5	1.3
<i>Caudatella heterocaudata</i>	0	0	1	0	1	0%	0.3	0.5
PLECOPTERA						6%	11	
<i>Claassenia sabulosa</i>	1	1	3	1	6	1%	1.5	1.0
<i>Hesperoperla pacifica</i>	1	2	1	1	5	1%	1.3	0.5
<i>Calineuria californica</i>	7	5	3	0	15	2%	3.8	3.0
<i>Skwala parallela</i>	2	0	0	0	2	0%	0.5	1.0
<i>Pteronarcys californica</i>	4	4	2	1	11	2%	2.8	1.5
Chloroperlinae	1	1	2	1	5	1%	1.3	0.5

MACROINVERTEBRATE DATA								
BLACKFOOT RIVER nr month - STATION 14 - 13 AUG 91								
Taxon	sample1	sample2	sample3	sample4	SUM	%RA	MEAN	S. D.
TRICHOPTERA						35%	60	
<i>Arctopsyche grandis</i>	0	5	3	3	11	2%	2.8	2.1
<i>Cheumatopsyche</i> spp.	1	0	3	1	5	1%	1.3	1.3
<i>Hydropsyche occidentalis</i>	8	34	12	34	88	13%	22.0	14.0
<i>Hydropsyche cockerelli</i>	5	28	14	18	65	10%	16.3	9.5
<i>H. (Ceratopsyche) spp.?</i>	0	1	2	2	5	1%	1.3	1.0
<i>Ochrotrichia</i> sp.	2	1	0	1	4	1%	1.0	0.8
<i>Oecetis</i> sp.	1	0	0	0	1	0%	0.3	0.5
<i>Wormaldia</i> sp.	0	0	1	1	2	0%	0.5	0.6
<i>Brachycentrus occidentalis</i>	2	9	18	1	30	4%	7.5	7.9
<i>Rhyacophila angelita</i>	0	0	0	1	1	0%	0.3	0.5
<i>Helicopsyche borealis</i>	1	0	0	0	1	0%	0.3	0.5
<i>Glossosoma</i> sp.	5	5	12	6	28	4%	7.0	3.4
ANNELIDA						0%	1	
Naididae	0	0	0	1	1	0%	0.3	0.5
Tubificidae	2	0	0	0	2	0%	0.5	1.0
MOLLUSCA						2%	4	
<i>Physella</i> sp.	10	1	0	0	11	2%	2.8	4.9
<i>Sphaeriidae</i>	5	0	0	0	5	1%	1.3	2.5
OTHER								0.0
Turbellaria	1	0	0	0	1	0%	0.3	0.5
TOTAL ORGANISMS	154	201	151	175	681		170	23
TAXA RICHNESS	36	27	26	32	49		30	4.6
SHAN. DIVERSITY	4.45	3.98	4.13	3.99	4.51		4.14	0.22
BIOTICINDEX	4.54	3.39	2.87	3.54	3.57		3.58	0.70
EPT RICHNESS	19	19	20	23	29		20	1.9
% R.A. DOMINANT	15%	17%	12%	19%	13%		16%	3.2%
% R.A. FILTERERS	12%	38%	35%	35%	31%		30%	12.1%
METALS TOLERANCE	3.97	3.72	3.30	3.98	3.75		3.74	0.32
Baetidae/Ephemeroptera	0.70	0.40	0.38	0.41	0.45		0.47	0.15
Hydropsychinae/Trichoptera	0.56	0.76	0.48	0.81	0.68		0.65	0.16
EPT / (EPT + CHIR.)	0.65	0.95	0.96	0.96	0.89		0.88	0.15
ID's by D. McGuire								

MACROINVERTEBRATE DATA								
CLARK FORK RIVER above MISSOULA - STATION 15.5 - 13 AUG 91								
Taxon	sample1	sample2	sample3	sample4	SUM	%RA	MEAN	S. D.
COLEOPTERA						6%	33	
<i>Optioservus spp.</i>	3	4	2	6	15	1%	3.8	1.7
<i>Zaitzevia sp.</i>	51	6	14	28	99	4%	24.8	19.7
<i>Ordobrevia sp.</i>	0	1	1	15	17	1%	4.3	7.2
DIPTERA						18%	101	
<i>Potthastia gaeddi gp.</i>	0	1	0	2	3	0%	0.8	1.0
<i>Cardiocladius spp.</i>	15	8	4	16	43	2%	10.8	5.7
<i>Cricotopus spp.</i>	25	19	2	16	62	3%	15.5	9.7
<i>Eukiefferiella spp.</i>	34	4	2	13	53	2%	13.3	14.6
<i>Eukiefferiella devonica gp.</i>	41	7	2	30	80	4%	20.0	18.6
<i>Orthocladius spp.</i>	1	0	0	1	2	0%	0.5	0.6
<i>Synorthocladius sp.</i>	0	1	0	0	1	0%	0.3	0.5
<i>Tvetenia sp.</i>	5	0	0	5	10	0%	2.5	2.9
<i>Polypedilum spp.</i>	25	20	6	15	66	3%	16.5	8.1
<i>Microtendipes sp</i>	2	0	0	0	2	0%	0.5	1.0
<i>Phaenopsectra sp</i>	1	0	2	2	5	0%	1.3	1.0
<i>Rheotanytarsus sp.</i>	1	4	3	5	13	1%	3.3	1.7
<i>Micropsectra spp.</i>	3	2	0	7	12	1%	3.0	2.9
<i>Antocha sp.</i>	0	1	1	0	2	0%	0.5	0.6
<i>Simulium (Eusimulium)</i>	12	8	2	28	50	2%	12.5	11.1
EPHEMEROPTERA						11%	62	
<i>Acentrella insignificans</i>	42	33	26	42	143	6%	35.8	7.8
<i>Baetis bicaudatus</i>	1	1	0	0	2	0%	0.5	0.6
<i>Baetis tricaudatus</i>	17	18	1	17	53	2%	13.3	8.2
<i>Serratella tibialis</i>	3	1	1	10	15	1%	3.8	4.3
<i>Drunella doddsi</i>	1	0	0	0	1	0%	0.3	0.5
<i>Drunella grandis</i>	9	4	3	5	21	1%	5.3	2.6
<i>Caudatella sp.</i>	0	1	0	0	1	0%	0.3	0.5
<i>Epeorus albertae</i>	1	6	0	2	9	0%	2.3	2.6
<i>Rhithrogena sp.</i>	0	0	0	1	1	0%	0.3	0.5
LEPIDOPTERA								
<i>Petrophila sp.</i>	0	3	2	0	5	0%	1.3	1.5
PLECOPTERA						1%	6	
<i>Claassenia sabulosa</i>	1	0	2	0	3	0%	0.8	1.0
<i>Hesperoperla pacifica</i>	2	0	0	0	2	0%	0.5	1.0
<i>Calineuria sp.</i>	6	0	0	0	6	0%	1.5	3.0
<i>Isogenoides sp.</i>	1	0	2	3	6	0%	1.5	1.3
<i>Skwala parallela</i>	1	0	1	0	2	0%	0.5	0.6
<i>Pteronarcella badia</i>	0	0	0	1	1	0%	0.3	0.5
<i>Pteronarcys californica</i>	0	0	0	2	2	0%	0.5	1.0

MACROINVERTEBRATE DATA								
CLARK FORK RIVER above MISSOULA - STATION 15.5 - 13 AUG 91								
Taxon	sample1	sample2	sample3	sample4	SUM	%RA	MEAN	S. D.
TRICHOPTERA						64%	356	
<i>Arctopsyche grandis</i>	8	9	1	45	63	3%	15.8	19.8
<i>Cheumatopsyche spp.</i>	19	16	4	46	85	4%	21.3	17.7
<i>Hydropsyche occidentalis</i>	105	111	21	146	383	17%	95.8	53.0
<i>Hydropsyche cockerelli</i>	161	188	117	394	860	38%	215.0	122.9
<i>Hydroptila spp.</i>	6	4	0	2	12	1%	3.0	2.6
<i>Ochrotrichia sp.</i>	3	0	0	0	3	0%	0.8	1.5
<i>Oecetis sp.</i>	0	0	1	0	1	0%	0.3	0.5
<i>Psychomyia flavida</i>	0	6	0	0	6	0%	1.5	3.0
<i>Brachycentrus occidentalis</i>	1	0	2	1	4	0%	1.0	0.8
<i>Rhyacophila brunnea gp.</i>	1	0	0	0	1	0%	0.3	0.5
<i>Glossosoma sp.</i>	2	2	2	0	6	0%	1.5	1.0
ANNELIDA						0%	2	
Lumbriculidae	0	1	0	0	1	0%	0.3	0.5
Naididae	1	1	0	5	7	0%	1.8	2.2
Tubificidae	0	0	0	1	1	0%	0.3	0.5
TOTAL ORGANISMS	611	491	227	912	2241		560	284
TAXA RICHNESS	36	31	27	32	49		32	3.7
SHAN. DIVERSITY	3.69	3.16	2.83	3.16	3.42		3.21	0.36
BIOTIC INDEX	4.87	4.48	4.26	4.46	4.55		4.52	0.26
EPT RICHNESS	21	14	14	15	27		16	3.4
% R.A. DOMINANT	26%	38%	52%	43%	38%		40%	10.5%
% R.A. FILTERERS	50%	68%	66%	73%	65%		64%	9.9%
METALS TOLERANCE	5.08	4.57	4.35	4.48	4.65		4.62	0.32
Baetidae/Ephemeroptera	0.81	0.81	0.87	0.77	0.80		0.82	0.04
Hydropsychinae/Trichoptera	0.93	0.94	0.96	0.92	0.93		0.94	0.02
EPT / (EPT + CHIR.)	0.72	0.86	0.90	0.86	0.83		0.83	0.08
ID's by D. McGuire								

MACROINVERTEBRATE DATA								
CLARK FORK RIVER @ SHUFFIELD'S - STATION 18 - 13 AUG 91								
Taxon	sample1	sample2	sample3	sample4	SUM	%RA	MEAN	S. D.
COLEOPTERA						1%	4	
<i>Optioservus spp.</i>	2	0	3	4	9	0%	2.3	1.7
<i>Zaitzevia sp.</i>	1	4	1	0	6	0%	1.5	1.7
DIPTERA						24%	152	
<i>Thienemannimyia gp.</i>	2	0	0	0	2	0%	0.5	1.0
<i>Potthastia gaeddi gp.</i>	1	2	0	17	20	1%	5.0	8.0
<i>Cardiocladius spp.</i>	3	7	0	2	12	0%	3.0	2.9
<i>Cricotopus spp.</i>	27	73	55	139	294	12%	73.5	47.6
<i>Eukiefferiella spp.</i>	3	1	3	3	10	0%	2.5	1.0
<i>Orthocladius spp.</i>	2	0	2	1	5	0%	1.3	1.0
<i>Nanocladius sp.</i>	1	0	0	0	1	0%	0.3	0.5
<i>Synorthocladius sp.</i>	0	2	0	3	5	0%	1.3	1.5
<i>Tvetenia sp.</i>	7	6	3	0	16	1%	4.0	3.2
<i>Polypedilum spp.</i>	40	39	28	53	160	6%	40.0	10.2
<i>Microtendipes sp</i>	0	3	3	2	8	0%	2.0	1.4
<i>Rheotanytarsus sp.</i>	9	3	7	10	29	1%	7.3	3.1
<i>Micropsectra spp.</i>	22	2	9	6	39	2%	9.8	8.7
<i>Antocha sp.</i>	2	1	0	0	3	0%	0.8	1.0
<i>Atherix pachypus</i>	2	0	0	0	2	0%	0.5	1.0
<i>Simulium (Eusimulium)</i>	1	0	1	0	2	0%	0.5	0.6
<i>Chelifera sp.</i>	0	0	0	1	1	0%	0.3	0.5
EPHEMEROPTERA						17%	106	
<i>Ameletus sp.</i>	0	0	1	0	1	0%	0.3	0.5
<i>Acentrella insignificans</i>	16	13	15	44	88	4%	22.0	14.7
<i>Baetis tricaudatus</i>	22	40	29	48	139	6%	34.8	11.5
<i>Attenella margarita</i>	3	2	1	5	11	0%	2.8	1.7
<i>Serratella tibialis</i>	6	3	1	3	13	1%	3.3	2.1
<i>Drunella grandis</i>	1	0	1	1	3	0%	0.8	0.5
<i>Timpango hecuba</i>	0	0	0	1	1	0%	0.3	0.5
<i>Epeorus albertae</i>	0	1	0	0	1	0%	0.3	0.5
<i>Nixe sp.</i>	2	3	3	8	16	1%	4.0	2.7
<i>Rhithrogena sp.</i>	0	1	2	0	3	0%	0.8	1.0
<i>Paraleptophlebia bicornuta</i>	1	0	2	0	3	0%	0.8	1.0
<i>Tricorythodes minutus</i>	26	19	49	51	145	6%	36.3	16.2
LEPIDOPTERA								
<i>Petrophila sp.</i>	5	3	3	4	15	1%	3.8	1.0
PLECOPTERA						3%	19	
<i>Claassenia sabulosa</i>	1	2	0	1	4	0%	1.0	0.8
<i>Isogenoides sp.</i>	10	11	11	25	57	2%	14.3	7.2
<i>Skwala parallela</i>	4	2	4	3	13	1%	3.3	1.0
<i>Pteronarcella badia</i>	1	0	0	0	1	0%	0.3	0.5
<i>Pteronarcys californica</i>	2	0	0	0	2	0%	0.5	1.0

MACROINVERTEBRATE DATA								
CLARK FORK RIVER @ SHUFFIELD'S - STATION 18 - 13 AUG 91								
Taxon	sample1	sample2	sample3	sample4	SUM	%RA	MEAN	S. D.
TRICHOPTERA						54%	341	
<i>Arctopsyche grandis</i>	77	84	31	30	222	9%	55.5	29.0
<i>Cheumatopsyche</i> spp.	41	78	61	48	228	9%	57.0	16.3
<i>Hydropsyche occidentalis</i>	100	79	45	21	245	10%	61.3	35.1
<i>Hydropsyche cockerelli</i>	233	222	82	97	634	25%	158.5	80.0
<i>Hydroptila</i> spp.	5	0	2	1	8	0%	2.0	2.2
<i>Oecetis</i> sp.	4	0	0	2	6	0%	1.5	1.9
<i>Psychomyia flavida</i>	0	1	1	0	2	0%	0.5	0.6
<i>Brachycentrus occidentalis</i>	3	2	0	2	7	0%	1.8	1.3
<i>Glossosoma</i> sp.	1	1	4	4	10	0%	2.5	1.7
ANNELIDA						0%	1	
Lumbricidae	1	0	0	0	1	0%	0.3	0.5
Tubificidae	0	0	0	1	1	0%	0.3	0.5
MOLLUSCA						0%	0	
<i>Ferrissia</i> sp.	0	0	0	1	1	0%	0.3	0.5
OTHER								0.0
Turbellaria	1	0	0	0	1	0%	0.3	0.5
TOTAL ORGANISMS	691	710	463	642	2506		627	113
TAXA RICHNESS	40	31	31	34	50		34	4.2
SHAN. DIVERSITY	3.51	3.31	3.78	3.78	3.74		3.60	0.23
BIOTIC INDEX	4.25	4.38	4.57	4.77	4.48		4.49	0.23
EPT RICHNESS	21	18	19	19	26		19	1.3
% R.A. DOMINANT	34%	31%	18%	22%	25%		26%	7.6%
% R.A. FILTERERS	67%	66%	49%	32%	55%		54%	16.4%
METALS TOLERANCE	4.09	4.67	4.82	5.31	4.70		4.72	0.50
Baetidae/Ephemeroptera	0.49	0.65	0.42	0.57	0.54		0.53	0.10
Hydropsychinae/Trichoptera	0.81	0.81	0.83	0.81	0.81		0.81	0.01
EPT / (EPT + CHIR.)	0.83	0.80	0.76	0.63	0.76		0.75	0.09
ID's by D. McGuire								

MACROINVERTEBRATE DATA								
BITTERROOT RIVER nr month - STATION 19 - 13 AUG 91								
Taxon	sample1	sample2	sample3	sample4	SUM	%RA	MEAN	S. D.
COLEOPTERA						5%	38	
<i>Optioservus</i> spp.	13	24	22	17	76	2%	19.0	5.0
<i>Zaitzevia</i> sp.	11	26	22	16	75	2%	18.8	6.6
DIPTERA						28%	228	
<i>Pagastia</i> sp	1	0	0	4	5	0%	1.3	1.9
<i>Potthastia gaeddi</i> gp.	1	3	0	1	5	0%	1.3	1.3
<i>Cardiocladius</i> spp.	28	12	45	22	107	3%	26.8	13.8
<i>Corynoneura</i> sp	0	0	0	1	1	0%	0.3	0.5
<i>Cricotopus</i> spp.	76	35	71	64	246	8%	61.5	18.3
<i>Eukiefferiella</i> spp.	11	3	20	13	47	1%	11.8	7.0
<i>Orthocladius (Euortho.)</i> spp.	5	3	0	9	17	1%	4.3	3.8
<i>Nanocladius</i> sp.	1	0	0	0	1	0%	0.3	0.5
<i>Synorthocladius</i> sp.	0	1	3	0	4	0%	1.0	1.4
<i>Tvetenia</i> sp.	10	11	3	7	31	1%	7.8	3.6
<i>Polypedilum</i> spp.	26	43	49	20	138	4%	34.5	13.7
<i>Microtendipes</i> sp	0	2	0	0	2	0%	0.5	1.0
<i>Rheotanytarsus</i> sp.	24	67	56	32	179	6%	44.8	20.1
<i>Micropsectra</i> spp.	1	6	0	1	8	0%	2.0	2.7
<i>Antocha</i> sp.	0	3	0	2	5	0%	1.3	1.5
<i>Atherix pachypus</i>	1	1	0	0	2	0%	0.5	0.6
<i>Simulium (Eusimulium)</i>	45	8	13	39	105	3%	26.3	18.5
<i>Chelifera</i> sp.	0	3	1	2	6	0%	1.5	1.3
<i>Protanyderus</i> sp.	1	0	1	0	2	0%	0.5	0.6
EPHEMEROPTERA						7%	56	
<i>Acentrella insignificans</i>	2	1	3	2	8	0%	2.0	0.8
<i>Baetis tricaudatus</i>	15	19	27	8	69	2%	17.3	7.9
<i>Attenella margarita</i>	1	3	2	1	7	0%	1.8	1.0
<i>Serratella tibialis</i>	1	4	4	2	11	0%	2.8	1.5
<i>Drunella grandis</i>	11	28	41	21	101	3%	25.3	12.6
<i>Epeorus albertae</i>	1	0	0	0	1	0%	0.3	0.5
<i>Rhithrogena</i> sp.	12	5	1	5	23	1%	5.8	4.6
<i>Paraleptophlebia bicornuta</i>	1	0	0	0	1	0%	0.3	0.5
<i>Tricorythodes minutus</i>	1	1	0	0	2	0%	0.5	0.6
LEPIDOPTERA								
<i>Petrophila</i> sp.	0	1	10	2	13	0%	3.3	4.6
PLECOPTERA						6%	48	
<i>Claassenia sabulosa</i>	0	0	0	2	2	0%	0.5	1.0
<i>Hesperoperla pacifica</i>	0	1	0	0	1	0%	0.3	0.5
<i>Isogenoides</i> sp.	14	11	7	10	42	1%	10.5	2.9
<i>Skwala parallela</i>	1	1	2	1	5	0%	1.3	0.5
<i>Pteronarcella badia</i>	39	54	31	17	141	4%	35.3	15.5

MACROINVERTEBRATE DATA								
BITTERROOT RIVER nr mouth - STATION 19 - 13 AUG 91								
Taxon	sample1	sample2	sample3	sample4	SUM	%RA	MEAN	S. D.
TRICHOPTERA						52%	425	
<i>Arctopsyche grandis</i>	8	13	15	2	38	1%	9.5	5.8
<i>Cheumatopsyche</i> spp.	26	83	82	23	214	7%	53.5	33.5
<i>Hydropsyche occidentalis</i>	212	324	277	132	945	29%	236.3	83.3
<i>Hydropsyche cockerelli</i>	90	79	130	63	362	11%	90.5	28.6
<i>Leucotrichia pictipes</i>	1	0	0	1	2	0%	0.5	0.6
<i>Zumatrichia notosa</i>	1	3	0	2	6	0%	1.5	1.3
<i>Oecetis</i> sp.	1	0	0	0	1	0%	0.3	0.5
<i>Brachycentrus occidentalis</i>	2	2	3	0	7	0%	1.8	1.3
<i>Protophila</i> sp.	0	0	0	1	1	0%	0.3	0.5
<i>Glossosoma</i> sp.	27	48	26	23	124	4%	31.0	11.5
ANNELIDA						1%	12	
Lumbricidae	7	11	21	2	41	1%	10.3	8.1
Naididae	2	2	0	0	4	0%	1.0	1.2
Tubificidae	2	0	0	0	2	0%	0.5	1.0
OTHER								0.0
Turbellaria	1	2	0	0	3	0%	0.8	1.0
TOTAL ORGANISMS	734	947	988	570	3239		810	195
TAXA RICHNESS	41	39	29	36	50		36	5.3
SHAN. DIVERSITY	3.82	3.68	3.72	4.00	3.88		3.81	0.15
BIOTIC INDEX	4.64	4.45	4.68	4.70	4.61		4.62	0.11
EPT RICHNESS	21	18	15	18	24		18	2.4
% R.A. DOMINANT	29%	34%	28%	23%	29%		29%	4.5%
% R.A. FILTERERS	55%	61%	58%	51%	57%		56%	4.2%
METALS TOLERANCE	5.07	4.45	4.89	5.14	4.85		4.89	0.31
Baetidae/Ephemeroptera	0.38	0.33	0.38	0.26	0.35		0.34	0.06
Hydropsychinae/Trichoptera	0.89	0.88	0.92	0.88	0.89		0.89	0.02
EPT / (EPT + CHIR.)	0.72	0.79	0.72	0.64	0.73		0.72	0.06
ID's by D. McGuire								

MACROINVERTEBRATE DATA								
CLARK FORK RIVER at HARPER BRIDGE - STATION 20 - 13 AUG 91								
Taxon	sample1	sample2	sample3	sample4	SUM	%RA	MEAN	S. D.
COLEOPTERA						2%	19	
<i>Optioservus spp.</i>	12	6	18	18	54	2%	13.5	5.7
<i>Zaitzevia sp.</i>	4	4	8	4	20	1%	5.0	2.0
Staphylinidae	0	0	0	1	1	0%	0.3	0.5
DIPTERA						26%	210	
<i>Thienemannimyia gp.</i>	5	2	5	2	14	0%	3.5	1.7
<i>Cardiocladius spp.</i>	4	7	3	9	23	1%	5.8	2.8
<i>Cricotopus spp.</i>	37	9	17	30	93	3%	23.3	12.6
<i>Eukiefferiella spp.</i>	14	7	3	13	37	1%	9.3	5.2
<i>Orthocladius spp.</i>	2	0	0	0	2	0%	0.5	1.0
<i>Tvetenia sp.</i>	23	8	3	14	48	2%	12.0	8.6
<i>Stictochironomus sp.</i>	0	0	1	0	1	0%	0.3	0.5
<i>Polypedilum spp.</i>	41	34	21	21	117	4%	29.3	9.9
<i>Microtendipes sp</i>	0	5	1	0	6	0%	1.5	2.4
<i>Phaenopsectra sp</i>	0	0	1	0	1	0%	0.3	0.5
<i>Rheotanytarsus sp.</i>	28	18	30	10	86	3%	21.5	9.3
<i>Tanytarsus sp.</i>	0	1	0	0	1	0%	0.3	0.5
<i>Micropsectra spp.</i>	76	48	34	33	191	6%	47.8	20.0
<i>Hexatoma sp.</i>	0	2	1	0	3	0%	0.8	1.0
<i>Atherix pachypus</i>	4	27	3	20	54	2%	13.5	11.9
<i>Simulium (Psilozoa)</i>	9	18	9	123	159	5%	39.8	55.7
<i>Chelifera sp.</i>	0	0	1	1	2	0%	0.5	0.6
<i>Protanyderus sp.</i>	0	0	0	1	1	0%	0.3	0.5
EPHEMEROPTERA						14%	108	
<i>Acentrella insignificans</i>	19	15	7	0	41	1%	10.3	8.5
<i>Baetis tricaudatus</i>	65	47	49	65	226	7%	56.5	9.8
<i>Attenella margarita</i>	13	1	6	0	20	1%	5.0	5.9
<i>Serratella tibialis</i>	3	4	5	1	13	0%	3.3	1.7
<i>Drunella grandis</i>	2	0	3	3	8	0%	2.0	1.4
<i>Nixe sp.</i>	1	1	0	0	2	0%	0.5	0.6
<i>Rhithrogena sp.</i>	14	7	11	22	54	2%	13.5	6.4
<i>Paraleptophlebia bicornuta</i>	1	1	0	0	2	0%	0.5	0.6
<i>Tricorythodes minutus</i>	22	16	23	6	67	2%	16.8	7.8
PLECOPTERA						3%	23	
<i>Claassenia sabulosa</i>	6	4	17	18	45	1%	11.3	7.3
<i>Isogenoides sp.</i>	1	0	1	6	8	0%	2.0	2.7
<i>Skwala parallela</i>	1	0	0	0	1	0%	0.3	0.5
<i>Pteronarcella badia</i>	2	9	12	12	35	1%	8.8	4.7
<i>Pteronarcys californica</i>	1	1	0	0	2	0%	0.5	0.6

MACROINVERTEBRATE DATA								
CLARK FORK RIVER at HARPER BRIDGE - STATION 20 - 13 AUG 91								
Taxon	sample1	sample2	sample3	sample4	SUM	%RA	MEAN	S. D.
TRICHOPTERA						55%	435	
<i>Arctopsyche grandis</i>	17	25	28	44	114	4%	28.5	11.3
<i>Cheumatopsyche spp.</i>	14	24	28	26	92	3%	23.0	6.2
<i>Hydropsyche occidentalis</i>	239	281	321	593	1434	45%	358.5	159.9
<i>Hydropsyche cockerelli</i>	12	30	20	30	92	3%	23.0	8.7
<i>Zumatrichia notosa</i>	1	0	0	0	1	0%	0.3	0.5
<i>Brachycentrus occidentalis</i>	1	2	2	1	6	0%	1.5	0.6
<i>Glossosoma sp.</i>	0	0	0	1	1	0%	0.3	0.5
ANNELIDA						0%	0	
Naididae	1	0	0	0	1	0%	0.3	0.5
TOTAL ORGANISMS	695	664	692	1128	3179		795	223
TAXA RICHNESS	34	31	32	29	43		32	2.1
SHAN. DIVERSITY	3.63	3.41	3.29	2.86	3.37		3.30	0.32
BIOTIC INDEX	4.72	4.58	4.60	4.86	4.72		4.69	0.13
EPT RICHNESS	20	16	15	14	21		16	2.6
% R.A. DOMINANT	34%	42%	46%	53%	45%		44%	7.6%
% R.A. FILTERERS	46%	60%	63%	73%	62%		61%	11.3%
METALS TOLERANCE	4.51	4.52	4.48	5.20	4.75		4.68	0.35
Baetidae/Ephemeroptera	0.60	0.67	0.54	0.67	0.62		0.62	0.06
Hydropsychinae/Trichoptera	0.93	0.93	0.92	0.93	0.93		0.93	0.00
EPT / (EPT + CHIR.)	0.65	0.77	0.82	0.86	0.79		0.78	0.09
ID's by D. McGuire								

MACROINVERTEBRATE DATA								
CLARK FORK RIVER at HUSON - STATION 22 - 14 AUG 91								
Taxon	sample1	sample2	sample3	sample4	SUM	%RA	MEAN	S. D.
COLEOPTERA						1%	8	
<i>Optioservus spp.</i>	2	6	7	7	22	1%	5.5	2.4
<i>Zaitzevia sp.</i>	1	4	1	2	8	0%	2.0	1.4
<i>Brychius sp.</i>	0	0	1	0	1	0%	0.3	0.5
Staphylinidae	1	0	0	0	1	0%	0.3	0.5
DIPTERA						21%	185	
<i>Thienemannimyia gp.</i>	2	1	7	2	12	0%	3.0	2.7
<i>Pagastia sp</i>	0	2	0	1	3	0%	0.8	1.0
<i>Potthastia gaeddi gp.</i>	0	0	1	0	1	0%	0.3	0.5
<i>Cardiocladius spp.</i>	4	5	1	2	12	0%	3.0	1.8
<i>Corynoneura sp</i>	0	0	0	0	0	0%	0.0	0.0
<i>Cricotopus spp.</i>	45	15	33	24	117	3%	29.3	12.8
<i>Eukiefferiella spp.</i>	4	1	1	3	9	0%	2.3	1.5
<i>Orthocladius spp.</i>	0	0	0	1	1	0%	0.3	0.5
<i>Thienemanniella sp.</i>	0	0	0	1	1	0%	0.3	0.5
<i>Tvetenia sp.</i>	15	21	21	22	79	2%	19.8	3.2
<i>Polypedilum spp.</i>	17	28	28	48	121	3%	30.3	12.9
<i>Microtendipes sp</i>	1	0	1	1	3	0%	0.8	0.5
<i>Phaenopsectra sp</i>	0	2	6	3	11	0%	2.8	2.5
<i>Cladotanytarsus sp.</i>	0	3	0	0	3	0%	0.8	1.5
<i>Rheotanytarsus sp.</i>	24	11	15	12	62	2%	15.5	5.9
<i>Micropsectra spp.</i>	27	21	18	38	104	3%	26.0	8.8
<i>Hexatoma sp.</i>	1	1	1	1	4	0%	1.0	0.0
<i>Atherix pachypus</i>	0	4	2	3	9	0%	2.3	1.7
<i>Simulium (Eusimulium)</i>	35	85	11	54	185	5%	46.3	31.3
<i>Chelifera sp.</i>	0	1	0	0	1	0%	0.3	0.5
EPHEMEROPTERA						11%	99	
<i>Ameletus sp.</i>	0	1	0	0	1	0%	0.3	0.5
<i>Acentrella insignificans</i>	0	1	2	1	4	0%	1.0	0.8
<i>Baetis tricaudatus</i>	87	81	113	35	316	9%	79.0	32.5
<i>Attenella margarita</i>	1	0	8	6	15	0%	3.8	3.9
<i>Serratella tibialis</i>	1	0	1	1	3	0%	0.8	0.5
<i>Ephemerella inermis</i>	0	0	0	1	1	0%	0.3	0.5
<i>Drunella grandis</i>	0	0	0	1	1	0%	0.3	0.5
<i>Epeorus albertae</i>	1	1	0	0	2	0%	0.5	0.6
<i>Nixe sp.</i>	0	1	0	2	3	0%	0.8	1.0
<i>Rhithrogena sp.</i>	7	17	1	14	39	1%	9.8	7.2
<i>Tricorythodes minutus</i>	2	1	6	2	11	0%	2.8	2.2
PLECOPTERA						2%	14	
<i>Claassenia sabulosa</i>	2	4	1	2	9	0%	2.3	1.3
<i>Hesperoperla pacifica</i>	0	1	0	1	2	0%	0.5	0.6
<i>Isogenoides sp.</i>	7	11	5	9	32	1%	8.0	2.6
<i>Skwala parallela</i>	0	2	0	1	3	0%	0.8	1.0
<i>Pteronarcella badia</i>	1	3	1	5	10	0%	2.5	1.9
<i>Isoperla sp.</i>	0	0	0	1	1	0%	0.3	0.5

MACROINVERTEBRATE DATA								
CLARK FORK RIVER at HUSON - STATION 22 - 14 AUG 91								
Taxon	sample1	sample2	sample3	sample4	SUM	%RA	MEAN	S. D.
TRICHOPTERA						65%	576	
<i>Arctopsyche grandis</i>	0	7	2	5	14	0%	3.5	3.1
<i>Cheumatopsyche</i> spp.	20	63	65	62	210	6%	52.5	21.7
<i>Hydropsyche occidentalis</i>	313	610	496	537	1956	55%	489.0	126.5
<i>Hydropsyche cockerelli</i>	12	32	31	38	113	3%	28.3	11.3
<i>Hydroptila</i> spp.	0	0	0	1	1	0%	0.3	0.5
<i>Brachycentrus occidentalis</i>	0	0	2	4	6	0%	1.5	1.9
<i>Glossosoma</i> sp.	3	1	0	1	5	0%	1.3	1.3
TOTAL ORGANISMS	636	1048	889	955	3528		882	176
TAXA RICHNESS	27	34	31	40	48		33	5.5
SHAN. DIVERSITY	2.79	2.54	2.56	2.76	2.73		2.66	0.13
BIOTIC INDEX	4.89	4.77	4.88	4.82	4.83		4.84	0.06
EPT RICHNESS	13	17	14	22	24		17	4.0
% R.A. DOMINANT	49%	58%	56%	56%	55%		55%	3.9%
% R.A. FILTERERS	64%	77%	70%	75%	72%		71%	6.0%
METALS TOLERANCE	4.97	4.86	5.00	4.80	4.90		4.91	0.09
Baetidae/Ephemeroptera	0.88	0.80	0.88	0.57	0.81		0.78	0.15
Hydropsychinae/Trichoptera	0.99	0.99	0.99	0.98	0.99		0.99	0.00
EPT / (EPT + CHIR.)	0.77	0.88	0.85	0.82	0.84		0.83	0.05
ID's by D. McGuire								

MACROINVERTEBRATE DATA								
CLARK FORK RIVER nr ALBERTON - STATION 23 - 14 AUG 91								
Taxon	sample1	sample2	sample3	sample4	SUM	%RA	MEAN	S. D.
COLEOPTERA						1%	11	
<i>Optioservus spp.</i>	11	8	12	5	36	1%	9.0	3.2
<i>Zaitzevia sp.</i>	2	0	4	1	7	0%	1.8	1.7
DIPTERA						14%	147	
<i>Thienemannimyia gp.</i>	5	0	1	2	8	0%	2.0	2.2
<i>Pagastia sp</i>	0	0	0	1	1	0%	0.3	0.5
<i>Cardiocladius spp.</i>	1	0	0	0	1	0%	0.3	0.5
<i>Cricotopus spp.</i>	42	84	59	55	240	6%	60.0	17.6
<i>Eukiefferiella spp.</i>	1	0	1	1	3	0%	0.8	0.5
<i>Orthocladius spp.</i>	2	3	0	0	5	0%	1.3	1.5
<i>Nanocladius sp.</i>	1	0	4	1	6	0%	1.5	1.7
<i>Tvetenia sp.</i>	19	4	2	4	29	1%	7.3	7.9
<i>Polypedilum spp.</i>	44	43	48	29	164	4%	41.0	8.3
<i>Microtendipes sp</i>	20	13	25	6	64	1%	16.0	8.3
<i>Phaenopsectra sp</i>	4	3	4	1	12	0%	3.0	1.4
<i>Xenochironomus sp.</i>	5	3	0	6	14	0%	3.5	2.6
<i>Rheotanytarsus sp.</i>	2	3	1	9	15	0%	3.8	3.6
<i>Micropsectra spp.</i>	12	0	9	1	22	1%	5.5	5.9
<i>Atherix pachypus</i>	0	0	0	1	1	0%	0.3	0.5
<i>Simulium (Eusimulium)</i>	2	0	1	0	3	0%	0.8	1.0
EPHEMEROPTERA						9%	97	
<i>Acentrella insignificans</i>	4	0	0	3	7	0%	1.8	2.1
<i>Baetis tricaudatus</i>	41	82	54	45	222	5%	55.5	18.5
<i>Attenella margarita</i>	15	11	6	13	45	1%	11.3	3.9
<i>Serratella tibialis</i>	2	1	0	0	3	0%	0.8	1.0
<i>Ephemerella inermis</i>	1	0	0	0	1	0%	0.3	0.5
<i>Drunella grandis</i>	0	3	6	1	10	0%	2.5	2.6
<i>Epeorus albertae</i>	0	4	0	2	6	0%	1.5	1.9
<i>Heptagenia soltari</i>	1	0	0	0	1	0%	0.3	0.5
<i>Nixe sp.</i>	7	36	14	2	59	1%	14.8	15.0
<i>Rhithrogena sp.</i>	3	7	7	1	18	0%	4.5	3.0
<i>Tricorythodes minutus</i>	5	6	0	3	14	0%	3.5	2.6
LEPIDOPTERA								
<i>Petrophila sp.</i>	4	20	12	5	41	1%	10.3	7.4
ODONATA								
<i>Ophiogomphus sp.</i>	1	1	0	3	5	0%	1.3	1.3
PLECOPTERA						1%	12	
<i>Claassenia sabulosa</i>	0	2	1	0	3	0%	0.8	1.0
<i>Hesperoperla pacifica</i>	1	0	0	2	3	0%	0.8	1.0
<i>Isogenoides sp.</i>	7	8	9	8	32	1%	8.0	0.8
<i>Pteronarcella badia</i>	0	4	1	0	5	0%	1.3	1.9
<i>Pteronarcys californica</i>	2	0	1	0	3	0%	0.8	1.0

MACROINVERTEBRATE DATA								
CLARK FORK RIVER nr ALBERTON - STATION 23 - 14 AUG 91								
Taxon	sample1	sample2	sample3	sample4	SUM	%RA	MEAN	S. D.
TRICHOPTERA						74%	788	
<i>Arctopsyche grandis</i>	3	1	1	1	6	0%	1.5	1.0
<i>Cheumatopsyche</i> spp.	121	218	131	171	641	15%	160.3	44.1
<i>Hydropsyche occidentalis</i>	435	410	394	414	1653	39%	413.3	16.9
<i>Hydropsyche cockerelli</i>	219	200	172	162	753	18%	188.3	26.1
<i>Hydroptila</i> spp.	1	0	4	1	6	0%	1.5	1.7
<i>Leucotrichia pictipes</i>	0	0	1	2	3	0%	0.8	1.0
<i>Zumatrichia notosa</i>	8	0	4	11	23	1%	5.8	4.8
<i>Ceraclea</i> sp.	6	3	1	7	17	0%	4.3	2.8
<i>Oecetis</i> sp.	3	1	3	5	12	0%	3.0	1.6
<i>Psychomyia flavida</i>	4	7	7	12	30	1%	7.5	3.3
<i>Brachycentrus occidentalis</i>	4	3	0	1	8	0%	2.0	1.8
ANNELIDA						0%	2	
Lumbricidae	1	0	0	0	1	0%	0.3	0.5
Naididae	1	0	0	2	3	0%	0.8	1.0
Tubificidae	4	0	0	1	5	0%	1.3	1.9
TOTAL ORGANISMS	1077	1192	1000	1001	4270		1068	90
TAXA RICHNESS	43	30	33	40	50		37	6.0
SHAN. DIVERSITY	3.08	3.01	3.01	2.91	3.07		3.00	0.07
BIOTIC INDEX	4.78	4.80	4.83	4.80	4.80		4.80	0.02
EPT RICHNESS	22	19	19	21	27		20	1.5
% R.A. DOMINANT	40%	34%	39%	41%	39%		39%	3.1%
% R.A. FILTERERS	73%	70%	70%	76%	72%		72%	2.7%
METALS TOLERANCE	4.82	5.02	4.99	4.97	4.95		4.95	0.09
Baetidae/Ephemeroptera	0.57	0.55	0.62	0.69	0.59		0.61	0.06
Hydropsychinae/Trichoptera	0.96	0.98	0.97	0.95	0.97		0.97	0.01
EPT / (EPT + CHIR.)	0.85	0.87	0.84	0.88	0.86		0.86	0.02
ID's by D. McGuire								

MACROINVERTEBRATE DATA								
CLARK FORK RIVER at SUPERIOR - STATION 24 - 14 AUG 91								
Taxon	sample1	sample2	sample3	sample4	SUM	%RA	MEAN	S. D.
COLEOPTERA						4%	17	
<i>Optioservus spp.</i>	2	15	18	11	46	2%	11.5	7.0
<i>Zaitzevia sp.</i>	3	6	9	2	20	1%	5.0	3.2
DIPTERA						16%	72	
unassociated midge pupa	0	1	0	0	1	0%	0.3	0.5
<i>Thienemannimyia gp.</i>	1	2	1	0	4	0%	1.0	0.8
<i>Pagastia sp</i>	4	2	0	4	10	1%	2.5	1.9
<i>Cardiocladius spp.</i>	1	4	5	3	13	1%	3.3	1.7
<i>Cricotopus spp.</i>	30	20	12	26	88	5%	22.0	7.8
<i>Eukiefferiella spp.</i>	1	2	2	5	10	1%	2.5	1.7
<i>Orthocladius spp.</i>	0	2	1	1	4	0%	1.0	0.8
<i>Tvetenia sp.</i>	5	6	2	5	18	1%	4.5	1.7
<i>Polypedilum spp.</i>	8	7	5	8	28	2%	7.0	1.4
<i>Microtendipes sp</i>	6	3	4	11	24	1%	6.0	3.6
<i>Xenochironomus sp.</i>	0	0	0	1	1	0%	0.3	0.5
<i>Rheotanytarsus sp.</i>	6	18	5	8	37	2%	9.3	6.0
<i>Tanytarsus sp.</i>	0	1	0	0	1	0%	0.3	0.5
<i>Micropsectra spp.</i>	10	14	19	4	47	3%	11.8	6.3
<i>Antocha sp.</i>	1	0	1	0	2	0%	0.5	0.6
EPHEMEROPTERA						22%	104	
<i>Acentrella insignificans</i>	49	49	74	49	221	12%	55.3	12.5
<i>Baetis tricaudatus</i>	10	19	30	13	72	4%	18.0	8.8
<i>Attenella margarita</i>	2	3	5	5	15	1%	3.8	1.5
<i>Serratella tibialis</i>	9	9	9	14	41	2%	10.3	2.5
<i>Drunella doddsi</i>	0	1	0	0	1	0%	0.3	0.5
<i>Drunella grandis</i>	12	7	11	10	40	2%	10.0	2.2
<i>Timpango hecuba</i>	0	0	0	1	1	0%	0.3	0.5
<i>Epeorus albertae</i>	1	0	0	3	4	0%	1.0	1.4
<i>Heptagenia soltari</i>	1	0	0	0	1	0%	0.3	0.5
<i>Nixe sp.</i>	3	5	1	2	11	1%	2.8	1.7
<i>Rhithrogena sp.</i>	0	1	2	1	4	0%	1.0	0.8
<i>Paraleptophlebia sp.</i>	1	0	0	0	1	0%	0.3	0.5
<i>Tricorythodes minutus</i>	1	0	1	0	2	0%	0.5	0.6
LEPIDOPTERA								
<i>Petrophila sp.</i>	1	0	0	1	2	0%	0.5	0.6
PLECOPTERA						1%	6	
<i>Claassenia sabulosa</i>	1	0	0	3	4	0%	1.0	1.4
<i>Hesperoperla pacifica</i>	0	0	1	0	1	0%	0.3	0.5
<i>Isogenoides sp.</i>	6	4	1	6	17	1%	4.3	2.4

MACROINVERTEBRATE DATA								
CLARK FORK RIVER at SUPERIOR - STATION 24 - 14 AUG 91								
Taxon	sample1	sample2	sample3	sample4	SUM	%RA	MEAN	S. D.
TRICHOPTERA						57%	265	
<i>Arctopsyche grandis</i>	0	5	6	6	17	1%	4.3	2.9
<i>Cheumatopsyche spp.</i>	54	87	111	103	355	19%	88.8	25.2
<i>Hydropsyche occidentalis</i>	66	66	132	78	342	18%	85.5	31.5
<i>Hydropsyche cockerelli</i>	41	62	87	75	265	14%	66.3	19.7
<i>Hydropsyche slossonae</i>	0	3	0	0	3	0%	0.8	1.5
<i>Hydroptila spp.</i>	13	10	6	8	37	2%	9.3	3.0
<i>Leucotrichia pictipes</i>	1	0	0	0	1	0%	0.3	0.5
<i>Ceraclea sp.</i>	1	4	1	0	6	0%	1.5	1.7
<i>Oecetis sp.</i>	0	1	0	1	2	0%	0.5	0.6
<i>Psychomyia flavida</i>	6	6	3	8	23	1%	5.8	2.1
<i>Brachycentrus occidentalis</i>	1	0	0	1	2	0%	0.5	0.6
<i>Glossosoma sp.</i>	3	1	0	2	6	0%	1.5	1.3
TOTAL ORGANISMS	361	446	565	479	1851		463	84
TAXA RICHNESS	35	34	30	34	46		33	2.2
SHAN. DIVERSITY	3.89	3.92	3.41	3.78	3.81		3.75	0.24
BIOTIC INDEX	4.53	4.58	4.50	4.50	4.53		4.53	0.04
EPT RICHNESS	21	19	17	20	28		19	1.7
% R.A. DOMINANT	18%	20%	23%	22%	19%		21%	2.2%
% R.A. FILTERERS	47%	54%	60%	57%	55%		54%	5.8%
METALS TOLERANCE	4.75	4.63	4.71	4.81	4.72		4.72	0.08
Baetidae/Ephemeroptera	0.66	0.72	0.78	0.63	0.71		0.70	0.07
Hydropsychinae/Trichoptera	0.87	0.89	0.95	0.91	0.91		0.90	0.04
EPT / (EPT + CHIR.)	0.80	0.81	0.90	0.84	0.84		0.83	0.04
ID's by D. McGuire								

MACROINVERTEBRATE DATA								
CLARK FORK RIVER above Flathead R. - STATION 25 - 16 AUG 91								
Taxon	sample1	sample2	sample3	sample4	SUM	%RA	MEAN	S. D.
COLEOPTERA						2%	11	
<i>Optioservus</i> spp.	12	5	7	8	32	1%	8.0	2.9
<i>Zaitzevia</i> sp.	1	1	1	7	10	0%	2.5	3.0
DIPTERA						30%	187	
<i>Thienemannimyia</i> gp.	1	1	1	1	4	0%	1.0	0.0
<i>Pagastia</i> sp	0	0	1	1	2	0%	0.5	0.6
<i>Cardiocladius</i> spp.	20	15	9	18	62	2%	15.5	4.8
<i>Corynoneura</i> sp	1	0	0	0	1	0%	0.3	0.5
<i>Cricotopus</i> spp.	24	10	55	18	107	4%	26.8	19.7
<i>Eukiefferiella</i> spp.	11	1	1	2	15	1%	3.8	4.9
<i>Eukiefferiella devonica</i> gp.	11	7	0	5	23	1%	5.8	4.6
<i>Orthocladius</i> spp.	0	0	1	2	3	0%	0.8	1.0
<i>Synorthocladius</i> sp.	0	0	1	0	1	0%	0.3	0.5
<i>Tvetenia</i> sp.	27	20	12	18	77	3%	19.3	6.2
<i>Polypedilum</i> spp.	22	13	6	9	50	2%	12.5	7.0
<i>Microtendipes</i> sp	6	9	12	15	42	2%	10.5	3.9
<i>Xenochironomus</i> sp.	1	2	3	1	7	0%	1.8	1.0
<i>Tanytarsus</i> sp.	0	1	0	0	1	0%	0.3	0.5
<i>Rheotanytarsus</i> sp.	29	77	25	41	172	7%	43.0	23.7
<i>Micropsectra</i> spp.	16	56	22	39	133	5%	33.3	18.0
<i>Antocha</i> sp.	0	0	1	1	2	0%	0.5	0.6
<i>Hexatoma</i> sp.	0	1	0	0	1	0%	0.3	0.5
<i>Atherix pachypus</i>	1	0	2	0	3	0%	0.8	1.0
<i>Simulium</i> (<i>Eusimulium</i>)	34	5	1	2	42	2%	10.5	15.8
EPHEMEROPTERA						12%	74	
<i>Acentrella insignificans</i>	24	15	8	12	59	2%	14.8	6.8
<i>Baetis tricaudatus</i>	13	4	9	8	34	1%	8.5	3.7
<i>Attenella margarita</i>	0	0	0	3	3	0%	0.8	1.5
<i>Serratella tibialis</i>	30	13	21	26	90	4%	22.5	7.3
<i>Drunella grandis</i>	19	6	9	8	42	2%	10.5	5.8
<i>Epeorus albertae</i>	5	2	1	5	13	1%	3.3	2.1
<i>Heptagenia soltari</i>	10	7	5	8	30	1%	7.5	2.1
<i>Nixe simplicioides</i>	3	2	2	0	7	0%	1.8	1.3
<i>Rhithrogena</i> sp.	3	9	0	7	19	1%	4.8	4.0
LEPIDOPTERA								
<i>Petrophila</i> sp.	0	0	1	1	2	0%	0.5	0.6
PLECOPTERA						2%	13	
<i>Claassenia sabulosa</i>	4	5	6	2	17	1%	4.3	1.7
<i>Isogenoides</i> sp.	10	6	5	14	35	1%	8.8	4.1

MACROINVERTEBRATE DATA								
CLARK FORK RIVER above Flathead R. - STATION 25 - 16 AUG 91								
Taxon	sample1	sample2	sample3	sample4	SUM	%RA	MEAN	S. D.
TRICHOPTERA						55%	345	
<i>Arctopsyche grandis</i>	16	10	6	15	47	2%	11.8	4.6
<i>Cheumatopsyche</i> spp.	190	134	110	160	594	23%	148.5	34.4
<i>Hydropsyche occidentalis</i>	140	95	103	94	432	17%	108.0	21.7
<i>Hydropsyche cockerelli</i>	116	57	50	69	292	12%	73.0	29.7
<i>Hydroptila</i> spp.	0	0	1	4	5	0%	1.3	1.9
<i>Ceraclea</i> sp.	0	0	2	4	6	0%	1.5	1.9
<i>Psychomyia flavida</i>	1	0	0	1	2	0%	0.5	0.6
<i>Brachycentrus occidentalis</i>	1	0	1	0	2	0%	0.5	0.6
ANNELIDA						0%	2	
Lumbriculidae	2	0	0	3	5	0%	1.3	1.5
Naididae	1	0	0	0	1	0%	0.3	0.5
Tubificidae	1	0	1	0	2	0%	0.5	0.6
OTHER								0.0
Turbellaria	0	0	0	1	1	0%	0.3	0.5
TOTAL ORGANISMS	806	589	502	633	2530		633	128
TAXA RICHNESS	35	30	36	37	46		35	3.1
SHAN. DIVERSITY	3.80	3.68	3.72	3.91	3.89		3.78	0.10
BIOTIC INDEX	4.66	4.70	4.78	4.55	4.66		4.67	0.10
EPT RICHNESS	16	14	16	17	19		16	1.3
% R.A. DOMINANT	24%	23%	22%	25%	23%		23%	1.4%
% R.A. FILTERERS	62%	51%	54%	54%	56%		55%	4.5%
METALS TOLERANCE	4.77	4.07	5.04	4.48	4.59		4.59	0.42
Baetidae/Ephemeroptera	0.35	0.33	0.31	0.26	0.31		0.31	0.04
Hydropsychinae/Trichoptera	0.96	0.97	0.96	0.93	0.96		0.96	0.02
EPT / (EPT + CHIR.)	0.78	0.63	0.69	0.72	0.71		0.71	0.06
ID's by D. McGuire								

MACROINVERTEBRATE DATA								
CLARK FORK RIVER above Thompson Falls D. - STATION 27 - 16 AUG 91								
Taxon	sample1	sample2	sample3	sample4	SUM	%RA	MEAN	S. D.
COLEOPTERA						2%	11	
<i>Optioservus</i> spp.	0	4	0	0	4	0%	1.0	2.0
<i>Zaitzevia</i> sp.	5	20	10	5	40	2%	10.0	7.1
DIPTERA						12%	60	
<i>Potthastia gaeddi</i> gp.	0	0	0	1	1	0%	0.3	0.5
<i>Cricotopus</i> spp.	8	20	13	7	48	2%	12.0	5.9
<i>Eukiefferiella</i> spp.	1	9	3	0	13	1%	3.3	4.0
<i>Orthocladius</i> spp.	1	0	2	1	4	0%	1.0	0.8
<i>Synbiocladus</i> sp.	0	2	0	0	2	0%	0.5	1.0
<i>Tvetenia</i> sp.	4	24	9	7	44	2%	11.0	8.9
<i>Polypedilum</i> spp.	0	10	1	0	11	1%	2.8	4.9
<i>Microtendipes</i> sp.	15	35	15	14	79	4%	19.8	10.2
<i>Dicrotendipes</i> sp.	1	0	0	0	1	0%	0.3	0.5
<i>Xenochironomus</i> sp.	0	1	2	0	3	0%	0.8	1.0
<i>Cladotanytarsus</i> sp.	2	0	0	2	4	0%	1.0	1.2
<i>Rheotanytarsus</i> sp.	2	14	3	2	21	1%	5.3	5.9
<i>Micropsectra</i> spp.	0	3	0	0	3	0%	0.8	1.5
<i>Ceratopogoninae</i>	0	0	0	1	1	0%	0.3	0.5
<i>Simulium</i> (<i>Eusimulium</i>)	0	1	1	2	4	0%	1.0	0.8
EPHEMEROPTERA						10%	49	
<i>Acentrella insignificans</i>	1	21	3	15	40	2%	10.0	9.6
<i>Baetis tricaudatus</i>	3	17	9	8	37	2%	9.3	5.8
<i>Attenella margarita</i>	1	2	0	0	3	0%	0.8	1.0
<i>Serratella tibialis</i>	1	2	0	0	3	0%	0.8	1.0
<i>Ephemerella inermis</i>	0	1	0	0	1	0%	0.3	0.5
<i>Drunella grandis</i>	0	8	3	1	12	1%	3.0	3.6
<i>Timpango hecuba</i>	0	1	0	0	1	0%	0.3	0.5
<i>Epeorus albertae</i>	1	6	6	3	16	1%	4.0	2.4
<i>Heptagenia soltari</i>	3	12	1	4	20	1%	5.0	4.8
<i>Nixe simplicoides</i>	3	4	0	2	9	0%	2.3	1.7
<i>Stenonema</i> sp.	9	12	4	4	29	1%	7.3	3.9
<i>Tricorythodes minutus</i>	4	8	5	7	24	1%	6.0	1.8
LEPIDOPTERA								
<i>Petrophila</i> sp.	4	1	4	3	12	1%	3.0	1.4
PLECOPTERA						0%	1	
<i>Claassenia sabulosa</i>	0	2	0	0	2	0%	0.5	1.0
<i>Isogenoides</i> sp.	0	0	0	1	1	0%	0.3	0.5
<i>Skwala parallela</i>	0	1	0	0	1	0%	0.3	0.5

MACROINVERTEBRATE DATA								
CLARK FORK RIVER above Thompson Falls D. - STATION 27 - 16 AUG 91								
Taxon	sample1	sample2	sample3	sample4	SUM	%RA	MEAN	S. D.
TRICHOPTERA						74%	360	
<i>Arctopsyche grandis</i>	0	1	0	0	1	0%	0.3	0.5
<i>Cheumatopsyche spp.</i>	143	594	108	173	1018	52%	254.5	227.9
<i>Hydropsyche occidentalis</i>	9	37	3	2	51	3%	12.8	16.5
<i>Hydropsyche cockerelli</i>	59	108	64	61	292	15%	73.0	23.4
<i>Hydroptila spp.</i>	9	6	3	15	33	2%	8.3	5.1
<i>Zumatrichia notosa</i>	2	3	6	0	11	1%	2.8	2.5
<i>Ceraclea sp.</i>	1	6	8	1	16	1%	4.0	3.6
<i>Psychomyia flavida</i>	4	2	0	1	7	0%	1.8	1.7
<i>Brachycentrus occidentalis</i>	0	5	1	0	6	0%	1.5	2.4
<i>Glossosoma sp.</i>	0	1	0	2	3	0%	0.8	1.0
ANNELIDA						0%	1	
Lumbriculidae	1	1	0	0	2	0%	0.5	0.6
MOLLUSCA						0%	2	
<i>Ferrissia sp.</i>	3	1	0	3	7	0%	1.8	1.5
OTHER								0.0
Turbellaria	1	1	0	1	3	0%	0.8	0.5
TOTAL ORGANISMS	301	1007	287	349	1944		486	348
TAXA RICHNESS	29	40	25	29	46		31	6.4
SHAN. DIVERSITY	2.89	2.66	3.20	2.84	2.92		2.90	0.22
BIOTIC INDEX	4.80	4.80	4.61	4.76	4.76		4.74	0.09
EPT RICHNESS	16	24	14	16	25		18	4.4
% R.A. DOMINANT	48%	59%	38%	50%	52%		48%	8.8%
% R.A. FILTERERS	70%	74%	62%	68%	71%		69%	5.2%
METALS TOLERANCE	5.01	5.29	4.95	5.11	5.16		5.09	0.15
Baetidae/Ephemeroptera	0.15	0.40	0.39	0.52	0.39		0.37	0.15
Hydropsychinae/Trichoptera	0.93	0.97	0.91	0.93	0.95		0.93	0.03
EPT / (EPT + CHIR.)	0.88	0.88	0.82	0.90	0.87		0.87	0.03
ID's by D. McGuire								

APPENDIX C

1992 Clark Fork River Macroinvertebrate Data

MACROINVERTEBRATE DATA								
SILVER BOW CREEK above Butte WWTP - STATION 00 - 12 AUG 92								
Taxon	sample1	sample2	sample3	sample4	SUM	%RA	MEAN	S. D.
COLEOPTERA						2%	3	
<i>Zaitzevia sp.</i>	0	1	0	2	3	0%	0.8	1.0
<i>Agabetes sp.</i>	1	0	1	1	3	0%	0.8	0.5
<i>Agabus sp.</i>	0	0	1	0	1	0%	0.3	0.5
<i>Hydroporus sp.</i>	0	0	0	1	1	0%	0.3	0.5
<i>Hydrovatus sp.</i>	0	0	1	0	1	0%	0.3	0.5
<i>Oreodytes sp.</i>	0	0	1	0	1	0%	0.3	0.5
<i>Brychius sp.</i>	0	0	3	0	3	0%	0.8	1.5
DIPTERA						97%	163	
<i>Thienemannimyia gp.</i>	1	0	0	0	1	0%	0.3	0.5
<i>Diamesa spp.</i>	0	0	0	1	1	0%	0.3	0.5
<i>Pagastia sp</i>	15	7	7	6	35	5%	8.8	4.2
<i>Cardiocladius spp.</i>	28	3	7	25	63	9%	15.8	12.6
<i>Cricotopus spp.</i>	244	56	121	88	509	76%	127.3	82.2
<i>Eukiefferiella spp.</i>	1	0	2	2	5	1%	1.3	1.0
<i>Orthocladius spp.</i>	0	20	0	0	20	3%	5.0	10.0
<i>Nanocladius sp.</i>	2	1	0	0	3	0%	0.8	1.0
<i>Aedes sp.</i>	0	0	0	1	1	0%	0.3	0.5
<i>Limnophora sp.</i>	5	1	5	2	13	2%	3.3	2.1
EPHEMEROPTERA						0%	1	
<i>Baetis tricaudatus</i>	2	1	0	0	3	0%	0.8	1.0
TRICHOPTERA						0%	0	
<i>Hydropsyche morosa</i>	0	0	0	1	1	0%	0.3	0.5
TOTAL ORGANISMS	299	90	149	130	668		167	91
TAXA RICHNESS	9	8	10	11	19		10	1.3
SHAN. DIVERSITY	1.05	1.65	1.21	1.59	1.45		1.38	0.29
BIOTIC INDEX	6.44	6.12	6.51	6.24	6.37		6.33	0.18
EPT RICHNESS	1	1	0	1	2		1	0.5
% R.A. DOMINANT	82%	62%	81%	68%	76%		73%	9.8%
% R.A. FILTERERS	0%	0%	0%	1%	0%		0%	0.4%
METALS TOLERANCE	9.73	8.37	9.72	9.53	9.50		9.34	0.65
Baetidae/Ephemeroptera*	1.00	1.00	1.00	1.00	1.00		1.00	0.00
Hydropsychinae/Trichoptera*	1.00	1.00	1.00	1.00	1.00		1.00	0.00
EPT / (EPT + CHIR.)	0.01	0.01	0.00	0.01	0.01		0.01	0.00
ID's by D. McGuire								

MACROINVERTEBRATE DATA								
SILVER BOW CREEK below Colo. tailings - STATION 01 - 12 AUG 92								
Taxon	sample1	sample2	sample3	sample4	SUM	%RA	MEAN	S. D.
COLEOPTERA						0%	2	
<i>Optioservus spp.</i>	0	0	0	1	1	0%	0.3	0.5
<i>Agabus sp.</i>	2	0	1	0	3	0%	0.8	1.0
<i>Hygrotes sp.</i>	0	0	0	1	1	0%	0.3	0.5
<i>Hydrovatus sp.</i>	1	0	0	0	1	0%	0.3	0.5
DIPTERA						95%	299	
<i>Thienemannimyia gp.</i>	0	0	0	1	1	0%	0.3	0.5
<i>Pagastia sp</i>	3	5	3	9	20	2%	5.0	2.8
<i>Cardiocladius spp.</i>	0	1	2	6	9	1%	2.3	2.6
<i>Cricotopus spp.</i>	47	78	66	58	249	20%	62.3	13.1
<i>Eukiefferiella spp.</i>	41	64	36	31	172	14%	43.0	14.6
<i>Chironomus sp.</i>	0	0	1	0	1	0%	0.3	0.5
<i>Dicrotendipes sp.</i>	1	1	0	1	3	0%	0.8	0.5
<i>Endochironomus sp.</i>	14	10	38	3	65	5%	16.3	15.2
<i>Simulium (Psilozoa)</i>	175	179	68	247	669	53%	167.3	74.0
<i>Limnophora sp.</i>	0	2	1	1	4	0%	1.0	0.8
<i>Aedes sp.</i>	1	2	0	0	3	0%	0.8	1.0
TRICHOPTERA						0%	0	
<i>H. (Ceratopsyche) spp.?</i>	0	1	0	0	1	0%	0.3	0.5
ANNELIDA						4%	14	
Tubificidae	14	9	6	26	55	4%	13.8	8.8
TOTAL ORGANISMS	299	352	222	385	1258		315	71
TAXA RICHNESS	10	11	10	12	17		11	1.0
SHAN. DIVERSITY	1.88	1.95	2.30	1.76	2.04		1.97	0.23
BIOTIC INDEX	7.35	7.27	7.66	7.12	7.31		7.35	0.23
EPT RICHNESS	0	1	0	0	1		0	0.5
% R.A. DOMINANT	59%	51%	31%	64%	53%		51%	14.7%
% R.A. FILTERERS	59%	51%	31%	64%	53%		51%	14.7%
METALS TOLERANCE	7.67	8.01	8.07	7.60	7.81		7.84	0.24
Baetidae/Ephemeroptera*	1.00	1.00	1.00	1.00	1.00		1.00	0.00
Hydropsychinae/Trichoptera*	1.00	1.00	1.00	1.00	1.00		1.00	0.00
EPT / (EPT + CHIR.)*	0.00	0.01	0.00	0.00	0.00		0.00	0.00
ID's by D. McGuire								
* default values								

MACROINVERTEBRATE DATA								
SILVER BOW CREEK @ Miles Crossing - STATION 02 - 12 AUG 92								
Taxon	sample1	sample2	sample3	sample4	SUM	%RA	MEAN	S. D.
COLEOPTERA						0%	0	
<i>Agabus sp.</i>	0	0	0	1	1	0%	0.3	0.5
DIPTERA						89%	100	
<i>Thienemannimyia gp.</i>	0	0	0	2	2	0%	0.5	1.0
<i>Procladius sp.</i>	0	0	0	1	1	0%	0.3	0.5
<i>Pagastia sp</i>	35	54	3	14	106	23%	26.5	22.6
<i>Cardiocladius spp.</i>	65	73	59	33	230	51%	57.5	17.3
<i>Cricotopus spp.</i>	5	12	7	12	36	8%	9.0	3.6
<i>Eukiefferiella spp.</i>	3	5	1	2	11	2%	2.8	1.7
<i>Simulium (Psilozoa)</i>	2	4	2	3	11	2%	2.8	1.0
<i>Limnophora sp.</i>	0	4	0	0	4	1%	1.0	2.0
TRICHOPTERA						11%	13	
<i>Hydropsyche occidentalis</i>	0	0	1	0	1	0%	0.3	0.5
<i>H. nr. morosa</i>	5	0	0	0	5	1%	1.3	2.5
<i>Hydropsyche slossonae</i>	13	22	7	3	45	10%	11.3	8.3
TOTAL ORGANISMS	128	174	80	71	453		113	48
TAXA RICHNESS	7	7	7	9	12		8	1.0
SHAN. DIVERSITY	1.93	2.09	1.41	2.26	2.09		1.92	0.37
BIOTIC INDEX	3.98	3.95	5.03	4.75	4.27		4.43	0.54
EPT RICHNESS	2	1	2	1	3		2	0.6
% R.A. DOMINANT	51%	42%	74%	46%	51%		53%	14.1%
% R.A. FILTERERS	16%	15%	13%	8%	14%		13%	3.2%
METALS TOLERANCE	8.59	8.64	8.73	8.69	8.65		8.66	0.06
Baetidae/Ephemeroptera*	1.00	1.00	1.00	1.00	1.00		1.00	0.00
Hydropsychinae/Trichoptera	1.00	1.00	1.00	1.00	1.00		1.00	0.00
EPT / (EPT + CHIR.)	0.14	0.13	0.10	0.04	0.12		0.11	0.04
ID's by D. McGuire								
*default value								

MACROINVERTEBRATE DATA								
SILVER BOW CREEK @ frontage road - STATION 03 - 12 AUG 92								
Taxon	sample1	sample2	sample3	sample4	SUM	%RA	MEAN	S. D.
COLEOPTERA						2%	10	
<i>Optioservus</i> spp.	1	7	24	6	38	2%	9.5	10.0
<i>Zaitzevia</i> sp.	1	0	0	0	1	0%	0.3	0.5
DIPTERA						40%	157	
<i>Thienemannimyia</i> gp.	0	3	2	1	6	0%	1.5	1.3
<i>Pagastia</i> sp	1	16	21	13	51	3%	12.8	8.5
<i>Cardiocladius</i> spp.	29	45	28	22	124	8%	31.0	9.8
<i>Cricotopus</i> spp.	0	17	2	7	26	2%	6.5	7.6
<i>Eukiefferiella</i> spp.	0	23	9	10	42	3%	10.5	9.5
<i>Orthocladius</i> spp.	0	7	0	1	8	1%	2.0	3.4
<i>Nanocladius</i> sp.	0	0	1	0	1	0%	0.3	0.5
<i>Tvetenia</i> sp.	0	3	0	1	4	0%	1.0	1.4
<i>Polypedilum</i> spp.	0	1	0	1	2	0%	0.5	0.6
<i>Antocha</i> sp.	0	1	0	3	4	0%	1.0	1.4
<i>Simulium</i> (<i>Eusimulium</i>)	44	185	62	66	357	23%	89.3	64.5
<i>Hemerodromia</i> sp.	0	2	2	0	4	0%	1.0	1.2
EPHEMEROPTERA						8%	32	
<i>Baetis tricaudatus</i>	8	31	55	34	128	8%	32.0	19.2
PLECOPTERA						0%	0	
<i>Skwala</i> sp.	0	1	0	0	1	0%	0.3	0.5
TRICHOPTERA						50%	196	
<i>Cheumatopsyche</i> spp.	0	1	9	4	14	1%	3.5	4.0
<i>Hydropsyche occidentalis</i>	11	24	48	17	100	6%	25.0	16.2
<i>Hydropsyche cockerelli</i>	0	6	0	0	6	0%	1.5	3.0
<i>Hydropsyche morosa</i>	9	92	66	66	233	15%	58.3	35.0
<i>Hydropsyche slossonae</i>	25	157	135	96	413	26%	103.3	57.9
<i>Hydroptila</i> spp.	0	7	6	2	15	1%	3.8	3.3
<i>Brachycentrus occidentalis</i>	0	2	0	1	3	0%	0.8	1.0
MOLLUSCA						0%	0	
<i>Gyraulus</i> sp.	0	0	0	1	1	0%	0.3	0.5
TOTAL ORGANISMS	129	631	470	352	1582		396	211
TAXA RICHNESS	9	21	15	19	24		16	5.3
SHAN. DIVERSITY	2.45	3.00	3.08	3.06	3.10		2.90	0.30
BIOTIC INDEX	4.71	4.77	4.50	4.60	4.64		4.64	0.12
EPT RICHNESS	4	9	6	7	9		7	2.1
% R.A. DOMINANT	34%	29%	29%	27%	26%		30%	3.0%
% R.A. FILTERERS	69%	74%	68%	71%	71%		71%	2.6%
METALS TOLERANCE	6.19	6.00	5.91	6.03	6.00		6.03	0.12
Baetidae/Ephemeroptera	1.00	1.00	1.00	1.00	1.00		1.00	0.00
Hydropsychinae/Trichoptera	1.00	0.97	0.98	0.98	0.98		0.98	0.01
EPT / (EPT + CHIR.)	0.64	0.74	0.84	0.80	0.78		0.75	0.09
ID's by D. McGuire								

MACROINVERTEBRATE DATA		
MILL-WILLOW BYPASS - STATION 05 - 13 AUG 92		
RBP KICK SAMPLE - 40seconds/50ft		
Taxon	300 organism	%RA
COLEOPTERA		1%
<i>Optioservus spp.</i>	3	1%
<i>Zaitzevia sp.</i>	1	0%
DIPTERA		56%
<i>Thienemannimyia gp.</i>	9	3%
<i>Pagastia sp</i>	1	0%
<i>Cricotopus spp.</i>	36	12%
<i>Eukiefferiella spp.</i>	3	1%
<i>Paraphaenocladus sp.</i>	4	1%
<i>Polypedilum spp.</i>	64	21%
<i>Microtendipes sp</i>	42	14%
<i>Phaenopsectra sp</i>	1	0%
<i>Rheotanytarsus sp.</i>	1	0%
<i>Tanytarsus sp.</i>	1	0%
<i>Micropsectra spp.</i>	3	1%
<i>Hexatoma sp.</i>	2	1%
EPHEMEROPTERA		7%
<i>Baetis tricaudatus</i>	19	6%
<i>Tricorythodes minutus</i>	3	1%
ODONATA		
<i>Ophiogomphus sp.</i>	1	0%
PLECOPTERA		0%
<i>Amphinemura sp.</i>	1	0%
TRICHOPTERA		23%
<i>Cheumatopsyche spp.</i>	4	1%
<i>Hydropsyche occidentalis</i>	12	4%
<i>Hydropsyche morosa</i>	51	17%
<i>Hydroptila spp.</i>	1	0%
<i>Oecetis sp.</i>	2	1%
CRUSTACEA		
<i>Hyallela azteca</i>	7	2%
MOLLUSCA		9%
<i>Physella sp.</i>	19	6%
<i>Gyraulus sp.</i>	6	2%
Lymnaeidae	1	0%

MACROINVERTEBRATE DATA			
MILL-WILLOW BYPASS - STATION 05 - 13 AUG 92			
RBP KICK SAMPLE - 40seconds/50ft			
Taxon	300 organism	%RA	
TOTAL ORGANISMS	298		
TAXA RICHNESS	27		
SHAN. DIVERSITY	3.54		
BIOTIC INDEX	5.50		
EPT RICHNESS	8		
% R.A. DOMINANT	21%		
% R.A. FILTERERS	23%		
METALS TOLERANCE	5.12		
Baetidae/Ephemeroptera	0.86		
Hydropsychinae/Trichoptera	0.96		
EPT / (EPT + CHIR.)	0.36		
ID's by D. McGuire			
Entire sample ~	1200 organisms		
Additional taxa present:	Paraleptophlebia debilis		

MACROINVERTEBRATE DATA		
WARM SPRINGS CREEK near mouth - STATION 06 - 13 AUG 92		
RBP KICK SAMPLE - 40seconds/50ft		
Taxon	300 organism	%RA
COLEOPTERA		16%
<i>Optioservus</i> spp.	39	13%
<i>Zaitzevia</i> sp.	2	1%
<i>Cleptelmis ornata</i>	1	0%
<i>Brychius</i> sp.	2	1%
<i>Oreodytes</i> spp.	3	1%
DIPTERA		10%
<i>Thienemannimyia</i> gp.	3	1%
<i>Ablabesmyia</i> sp.	1	0%
<i>Pagastia</i> sp	6	2%
<i>Cricotopus nostococladius</i>	1	0%
<i>Microsectra</i> spp.	17	6%
<i>Hexatoma</i> sp.	1	0%
<i>Tipula</i> sp.	1	0%
EPHEMEROPTERA		9%
<i>Baetis tricaudatus</i>	9	3%
<i>Paraleptophlebia bicornuta</i>	2	1%
<i>Paraleptophlebia debilis</i>	16	5%
PLECOPTERA		5%
<i>Hesperoperla pacifica</i>	8	3%
<i>Skwala parallela</i>	2	1%
<i>Pteronarcella badia</i>	5	2%
<i>Amphinemura</i> sp.	1	0%
TRICHOPTERA		26%
<i>Arctopsyche grandis</i>	2	1%
<i>Cheumatopsyche</i> spp.	3	1%
<i>Hydropsyche morosa</i>	9	3%
<i>Hydropsyche slossonae</i>	28	10%
<i>Hydroptila</i> spp.	7	2%
<i>Oecetis</i> sp.	14	5%
<i>Nectopsyche</i> sp.	2	1%
<i>Helicopsyche borealis</i>	11	4%
<i>Agapetus</i> sp.	1	0%
MOLLUSCA		33%
<i>Physella</i> sp.	65	22%
<i>Gyraulus</i> sp.	27	9%
<i>Fossaria</i> sp.	5	2%

MACROINVERTEBRATE DATA		
WARM SPRINGS CREEK near mouth - STATION 06 - 13 AUG 92		
RBP KICK SAMPLE - 40seconds/50ft		
Taxon	300 organism	%RA
TOTAL ORGANISMS	294	
TAXA RICHNESS	31	
SHAN. DIVERSITY	3.94	
BIOTIC INDEX	5.28	
EPT RICHNESS	16	
% R.A. DOMINANT	22%	
% R.A. FILTERERS	14%	
METALS TOLERANCE	3.96	
Baetidae/Ephemeroptera	0.33	
Hydropsychinae/Trichoptera	0.52	
EPT / (EPT + CHIR.)	0.81	
ID's by D. McGuire		
Entire sample ~	2000	
Additional taxa present:	Rhyacophila brunnea gp., Sphaeriidae	

MACROINVERTEBRATE DATA								
CLARK FORK RIVER below Warm Springs Cr. - STATION 07 - 13 AUG 92								
Taxon	sample1	sample2	sample3	sample4	SUM	%RA	MEAN	S. D.
COLEOPTERA						31%	416	
<i>Optioservus spp.</i>	340	294	285	374	1293	24%	323.3	41.5
<i>Zaitzevia sp.</i>	53	90	87	99	329	6%	82.3	20.2
<i>Cleptelmis ornata</i>	7	24	11	1	43	1%	10.8	9.7
DIPTERA						5%	64	
<i>Thienemannimyia gp.</i>	7	0	1	1	9	0%	2.3	3.2
<i>Pagastia sp</i>	5	9	3	2	19	0%	4.8	3.1
<i>Cricotopus spp.</i>	1	1	5	6	13	0%	3.3	2.6
<i>Cricotopus nostococladius</i>	0	0	0	1	1	0%	0.3	0.5
<i>Eukiefferiella spp.</i>	0	5	1	5	11	0%	2.8	2.6
<i>Orthocladius spp.</i>	2	1	0	0	3	0%	0.8	1.0
<i>Paraphaenocladius sp.</i>	0	0	1	0	1	0%	0.3	0.5
<i>Polypedilum spp.</i>	30	17	9	40	96	2%	24.0	13.7
<i>Microtendipes sp</i>	38	3	25	10	76	1%	19.0	15.6
<i>Phaenopsectra sp</i>	1	1	0	0	2	0%	0.5	0.6
<i>Antocha sp.</i>	0	0	0	2	2	0%	0.5	1.0
<i>Hexatoma sp.</i>	1	0	0	0	1	0%	0.3	0.5
<i>Dicranota sp.</i>	0	1	0	0	1	0%	0.3	0.5
<i>Simulium (Psilozoa)</i>	12	6	0	1	19	0%	4.8	5.5
<i>Hemerodromia sp.</i>	0	0	1	0	1	0%	0.3	0.5
EPHEMEROPTERA						5%	74	
<i>Baetis tricaudatus</i>	76	63	53	104	296	5%	74.0	22.1
Heptageniidae	1	0	0	0	1	0%	0.3	0.5
LEPIDOPTERA								
<i>Petrophila sp.</i>	2	0	0	0	2	0%	0.5	1.0
ODONATA								
<i>Ophiogomphus sp.</i>	1	0	0	1	2	0%	0.5	0.6
PLECOPTERA						2%	29	
<i>Claassenia sabulosa</i>	1	0	0	0	1	0%	0.3	0.5
<i>Hesperoperla pacifica</i>	2	2	5	0	9	0%	2.3	2.1
<i>Amphinemura sp.</i>	1	0	0	0	1	0%	0.3	0.5
<i>Skwala parallela</i>	3	3	5	1	12	0%	3.0	1.6
<i>Pteronarcella badia</i>	21	22	14	33	90	2%	22.5	7.9
<i>Isoperla fulva</i>	2	0	0	0	2	0%	0.5	1.0

MACROINVERTEBRATE DATA								
CLARK FORK RIVER below Warm Springs Cr. - STATION 07 - 13 AUG 92								
Taxon	sample1	sample2	sample3	sample4	SUM	%RA	MEAN	S. D.
TRICHOPTERA						57%	769	
<i>Cheumatopsyche</i> spp.	29	22	11	26	88	2%	22.0	7.9
<i>Hydropsyche occidentalis</i>	793	621	306	708	2428	45%	607.0	212.6
<i>Hydropsyche cockerelli</i>	10	7	6	5	28	1%	7.0	2.2
<i>H. nr. morosa</i>	161	79	55	120	415	8%	103.8	46.7
<i>Hydroptila</i> spp.	0	0	0	10	10	0%	2.5	5.0
<i>Ceraclea</i> sp.	1	0	0	0	1	0%	0.3	0.5
<i>Oecetis</i> sp.	1	16	15	25	57	1%	14.3	9.9
<i>Helicopsyche borealis</i>	5	20	5	16	46	1%	11.5	7.7
<i>Protophila</i> sp.	1	0	0	0	1	0%	0.3	0.5
MOLLUSCA						0%	1	
<i>Physella</i> sp.	0	0	0	1	1	0%	0.3	0.5
<i>Gyra lus</i> sp.	0	0	0	1	1	0%	0.3	0.5
TOTAL ORGANISMS	1608	1307	904	1593	5412		1353	330
TAXA RICHNESS	30	22	21	25	39		25	4.0
SHAN. DIVERSITY	2.45	2.51	2.70	2.56	2.60		2.56	0.11
BIOTIC INDEX	4.91	4.83	4.84	4.91	4.88		4.87	0.04
EPT RICHNESS	16	10	10	10	17		12	3.0
% R.A. DOMINANT	49%	48%	34%	44%	45%		44%	6.9%
% R.A. FILTERERS	63%	56%	42%	54%	55%		54%	8.7%
METALS TOLERANCE	5.02	5.01	4.97	5.00	5.01		5.00	0.02
Baetidae/Ephemeroptera	0.99	1.00	1.00	1.00	1.00		1.00	0.01
Hydropsychinae/Trichoptera	0.99	0.95	0.95	0.94	0.96		0.96	0.02
EPT / (EPT + CHIR.)	0.93	0.96	0.91	0.94	0.94		0.94	0.02
ID's by D. McGuire								

MACROINVERTEBRATE DATA								
CLARK FORK RIVER nr. Dempsey - STATION 08 - 13 AUG 92								
Taxon	sample1	sample2	sample3	sample4	SUM	%RA	MEAN	S. D.
COLEOPTERA						24%	333	
<i>Optioservus spp.</i>	224	115	331	379	1049	19%	262.3	117.6
<i>Zaitzevia sp.</i>	82	5	85	68	240	4%	60.0	37.4
<i>Deronectes sp.</i>	0	0	0	1	1	0%	0.3	0.5
<i>Oreodytes spp.</i>	9	15	11	2	37	1%	9.3	5.4
Hydrophilidae	0	0	1	0	1	0%	0.3	0.5
<i>Brychius sp.</i>	1	0	3	0	4	0%	1.0	1.4
DIPTERA						6%	85	
<i>Thienemannimyia gp.</i>	3	2	8	1	14	0%	3.5	3.1
<i>Pentaneura sp.</i>	7	0	10	33	50	1%	12.5	14.3
<i>Pagastia sp</i>	0	0	1	0	1	0%	0.3	0.5
<i>Potthastia gaeddi gp.</i>	0	1	0	0	1	0%	0.3	0.5
<i>Cricotopus spp.</i>	0	0	0	5	5	0%	1.3	2.5
<i>Orthocladus spp.</i>	1	0	0	13	14	0%	3.5	6.4
<i>Parametriocnemus sp.</i>	0	0	0	1	1	0%	0.3	0.5
<i>Paraphaenocladus sp.</i>	0	0	0	4	4	0%	1.0	2.0
<i>Polypedilum spp.</i>	22	8	91	69	190	3%	47.5	39.0
<i>Microtendipes sp</i>	1	2	0	2	5	0%	1.3	1.0
<i>Phaenopsectra sp</i>	0	1	10	12	23	0%	5.8	6.1
<i>Antocha sp.</i>	0	0	0	1	1	0%	0.3	0.5
<i>Hexatoma sp.</i>	1	3	3	0	7	0%	1.8	1.5
<i>Simulium (Eusimulium)</i>	3	0	15	5	23	0%	5.8	6.5
<i>Limnophora sp.</i>	0	0	1	0	1	0%	0.3	0.5
EPHEMEROPTERA						11%	149	
<i>Baetis tricaudatus</i>	72	22	129	78	301	5%	75.3	43.8
<i>Baetis punctiventris</i>	28	2	51	109	190	3%	47.5	45.6
<i>Attenella margarita</i>	0	0	0	1	1	0%	0.3	0.5
<i>Stenonema sp.</i>	0	0	0	1	1	0%	0.3	0.5
<i>Paraleptophlebia bicornuta</i>	0	0	0	1	1	0%	0.3	0.5
<i>Paraleptophlebia debilis</i>	0	0	2	0	2	0%	0.5	1.0
<i>Tricorythodes minutus</i>	6	11	56	25	98	2%	24.5	22.5
HEMIPTERA								
<i>Sigara sp.</i>	0	8	1	0	9	0%	2.3	3.9
LEPIDOPTERA								
<i>Petrophila sp.</i>	0	3	1	0	4	0%	1.0	1.4
ODONATA								
<i>Ophiogomphus sp.</i>	0	1	0	0	1	0%	0.3	0.5

MACROINVERTEBRATE DATA								
CLARK FORK RIVER @ Sager Lane - STATION 08.5 - 13 AUG 92								
Taxon	sample1	sample2	sample3	sample4	SUM	%RA	MEAN	S. D.
COLEOPTERA						6%	69	
<i>Optioservus spp.</i>	25	54	63	61	203	4%	50.8	17.6
<i>Zaitzevia sp.</i>	20	16	21	12	69	1%	17.3	4.1
<i>Deronectes sp.</i>	1	0	0	0	1	0%	0.3	0.5
<i>Hydrophilidae</i>	0	0	1	0	1	0%	0.3	0.5
DIPTERA						28%	320	
<i>Ablabesmyia sp.</i>	1	2	0	0	3	0%	0.8	1.0
<i>Thienemannimyia gp.</i>	4	3	4	1	12	0%	3.0	1.4
<i>Pagastia sp</i>	0	0	2	0	2	0%	0.5	1.0
<i>Potthastia gaeddi gp.</i>	1	21	3	9	34	1%	8.5	9.0
<i>Corynoneura sp</i>	0	1	0	0	1	0%	0.3	0.5
<i>Cricotopus spp.</i>	39	142	30	158	369	8%	92.3	67.1
<i>Eukiefferiella spp.</i>	1	6	42	0	49	1%	12.3	20.0
<i>Thienemanniella sp.</i>	0	1	0	0	1	0%	0.3	0.5
<i>Orthocladius spp.</i>	0	1	0	0	1	0%	0.3	0.5
<i>Cryptochironomus sp.</i>	0	0	1	0	1	0%	0.3	0.5
<i>Endochironomus sp.</i>	1	5	0	0	6	0%	1.5	2.4
<i>Polypedilum spp.</i>	129	167	210	109	615	13%	153.8	44.6
<i>Microtendipes sp</i>	13	51	19	59	142	3%	35.5	22.9
<i>Phaenopsectra sp</i>	2	4	0	4	10	0%	2.5	1.9
<i>Tanytarsus sp.</i>	0	3	1	1	5	0%	1.3	1.3
<i>Antocha sp.</i>	0	3	1	0	4	0%	1.0	1.4
<i>Hexatoma sp.</i>	0	1	0	0	1	0%	0.3	0.5
<i>Simulium (Eusimulium)</i>	0	0	22	0	22	0%	5.5	11.0
<i>Hemcerodromia sp.</i>	0	2	1	0	3	0%	0.8	1.0
EPHEMEROPTERA						37%	429	
<i>Acentrella insignificans</i>	2	3	0	2	7	0%	1.8	1.3
<i>Baetis tricaudatus</i>	54	107	449	47	657	14%	164.3	191.7
<i>Baetis punctiventris</i>	7	2	11	5	25	1%	6.3	3.8
<i>Attenella margarita</i>	0	3	2	0	5	0%	1.3	1.5
<i>Heptagenia sp.</i>	1	0	0	1	2	0%	0.5	0.6
<i>Paraleptophlebia bicornuta</i>	2	1	3	0	6	0%	1.5	1.3
<i>Paraleptophlebia sp.</i>	1	1	1	1	4	0%	1.0	0.0
<i>Tricorythodes minutus</i>	177	327	195	310	1009	22%	252.3	77.2
MEGALOPTERA								
<i>Sigara sp.</i>	0	3	0	0	3	0%	0.8	1.5
LEPIDOPTERA								
<i>Petrophila sp.</i>	2	3	2	0	7	0%	1.8	1.3
ODONATA								
<i>Ophiogomphus sp.</i>	1	1	1	0	3	0%	0.8	0.5

MACROINVERTEBRATE DATA								
CLARK FORK RIVER @ Sager Lane - STATION 08.5 - 13 AUG 92								
Taxon	sample1	sample2	sample3	sample4	SUM	%RA	MEAN	S. D.
PLECOPTERA						0%	3	
<i>Isogenoides sp.</i>	1	1	3	0	5	0%	1.3	1.3
<i>Skwala sp.</i>	2	4	1	1	8	0%	2.0	1.4
TRICHOPTERA						28%	325	
<i>Cheumatopsyche spp.</i>	3	8	9	3	23	0%	5.8	3.2
<i>Hydropsyche occidentalis</i>	11	17	41	1	70	2%	17.5	17.0
<i>H. nr. morosa</i>	38	113	162	40	353	8%	88.3	60.3
<i>Hydroptila spp.</i>	12	24	25	26	87	2%	21.8	6.6
<i>Ochrotrichia sp.</i>	1	3	7	5	16	0%	4.0	2.6
<i>Oxyethira sp.</i>	0	0	0	1	1	0%	0.3	0.5
<i>Nectopsyche sp.</i>	5	78	43	53	179	4%	44.8	30.3
<i>Oecetis sp.</i>	32	116	116	121	385	8%	96.3	42.9
<i>Helicopsyche borealis</i>	10	78	43	53	184	4%	46.0	28.2
ANNELIDA						0%	3	
Tubificidae	3	4	0	3	10	0%	2.5	1.7
MOLLUSCA						0%	4	
<i>Physella sp.</i>	0	7	2	1	10	0%	2.5	3.1
<i>Gyraulus sp.</i>	1	1	0	0	2	0%	0.5	0.6
<i>Fossaria sp.</i>	2	2	0	0	4	0%	1.0	1.2
<i>Sphaeriidae</i>	0	0	1	0	1	0%	0.3	0.5
TOTAL ORGANISMS	605	1390	1538	1088	4621		1155	412
TAXA RICHNESS	34	42	35	27	50		35	6.1
SHAN. DIVERSITY	3.41	3.73	3.44	3.36	3.69		3.49	0.17
BIOTIC INDEX	5.14	5.26	5.04	5.40	5.20		5.21	0.16
EPT RICHNESS	17	17	16	16	19		17	0.6
% R.A. DOMINANT	29%	24%	29%	28%	22%		28%	2.7%
% R.A. FILTERERS	9%	10%	15%	4%	10%		9%	4.6%
METALS TOLERANCE	4.61	4.81	4.73	4.89	4.78		4.76	0.12
Baetidae/Ephemeroptera	0.26	0.25	0.70	0.15	0.40		0.34	0.24
Hydropsychinae/Trichoptera	0.46	0.32	0.48	0.15	0.34		0.35	0.15
EPT / (EPT + CHIR.)	0.65	0.69	0.78	0.66	0.71		0.70	0.06
ID's by D. McGuire								

MACROINVERTEBRATE DATA								
CLARK FORK RIVER @ Deerlodge - STATION 09 - 13 AUG 92								
Taxon	sample1	sample2	sample3	sample4	SUM	%RA	MEAN	S. D.
COLEOPTERA						5%	119	
<i>Optioservus spp.</i>	33	61	32	84	210	2%	52.5	24.9
<i>Zaitzevia sp.</i>	47	47	35	137	266	3%	66.5	47.3
DIPTERA						9%	207	
<i>Thienemannimyia gp.</i>	1	5	0	1	7	0%	1.8	2.2
<i>Pentaneura sp.</i>	0	5	0	3	8	0%	2.0	2.4
<i>Pagastia sp</i>	0	0	0	3	3	0%	0.8	1.5
<i>Cardiocladius spp.</i>	0	0	7	0	7	0%	1.8	3.5
<i>Cricotopus spp.</i>	0	0	3	1	4	0%	1.0	1.4
<i>Eukiefferiella spp.</i>	0	1	11	0	12	0%	3.0	5.4
<i>Orthocladius spp.</i>	1	0	0	10	11	0%	2.8	4.9
<i>Paraphaenocladius sp.</i>	0	1	4	11	16	0%	4.0	5.0
<i>Nanocladius sp.</i>	0	0	2	0	2	0%	0.5	1.0
<i>Tvetenia sp.</i>	3	5	8	40	56	1%	14.0	17.5
<i>Cryptochironomus sp.</i>	0	0	1	0	1	0%	0.3	0.5
<i>Polypedilum spp.</i>	9	89	90	228	416	5%	104.0	91.0
<i>Microtendipes sp</i>	0	5	3	1	9	0%	2.3	2.2
<i>Phaenopsectra sp</i>	0	0	3	0	3	0%	0.8	1.5
<i>Antocha sp.</i>	2	0	1	3	6	0%	1.5	1.3
<i>Hexatoma sp.</i>	1	0	0	1	2	0%	0.5	0.6
<i>Ceratopogoninae</i>	0	1	0	0	1	0%	0.3	0.5
<i>Atherix pachypus</i>	0	0	1	0	1	0%	0.3	0.5
<i>Simulium (Psilozoa)</i>	4	10	197	15	226	2%	56.5	93.8
<i>Hemerodromia sp.</i>	0	4	7	25	36	0%	9.0	11.0
EPHEMEROPTERA						8%	190	
<i>Baetis tricaudatus</i>	94	254	98	303	749	8%	187.3	107.3
<i>Baetis punctiventris</i>	0	0	0	2	2	0%	0.5	1.0
<i>Tricorythodes minutus</i>	6	2	0	1	9	0%	2.3	2.6
PLECOPTERA						0%	9	
<i>Isogenoides sp.</i>	4	6	0	1	11	0%	2.8	2.8
<i>Skwala sp.</i>	3	2	1	8	14	0%	3.5	3.1
<i>Pteronarcella badia</i>	1	1	2	6	10	0%	2.5	2.4
<i>Isoperla fulva</i>	0	0	0	1	1	0%	0.3	0.5

MACROINVERTEBRATE DATA								
CLARK FORK RIVER @ Deerlodge - STATION 09 - 13 AUG 92								
Taxon	sample1	sample2	sample3	sample4	SUM	%RA	MEAN	S. D.
TRICHOPTERA						76%	1745	
<i>Cheumatopsyche</i> spp.	25	37	25	146	233	3%	58.3	58.8
<i>Hydropsyche occidentalis</i>	287	983	992	1504	3766	41%	941.5	499.7
<i>H. morosa?</i>	355	521	1089	950	2915	32%	728.8	347.2
<i>Hydroptila</i> spp.	0	5	1	0	6	0%	1.5	2.4
<i>Ochrotrichia</i> sp.	0	6	3	2	11	0%	2.8	2.5
<i>Limnephilus</i> sp.	2	0	0	0	2	0%	0.5	1.0
<i>Ononcomoeus</i> sp.	0	0	0	2	2	0%	0.5	1.0
<i>Nectopsyche</i> sp.	0	1	1	0	2	0%	0.5	0.6
<i>Oecetis</i> sp.	5	10	0	15	30	0%	7.5	6.5
<i>Helicopsyche borealis</i>	1	5	4	0	10	0%	2.5	2.4
<i>Glossosoma</i> sp.	0	1	0	0	1	0%	0.3	0.5
ANNELIDA						0%	0	
Tubificidae	1	0	0	0	1	0%	0.3	0.5
MOLLUSCA						0%	1	
<i>Physella</i> sp.	0	0	1	1	2	0%	0.5	0.6
<i>Gyraulus</i> sp.	1	0	1	0	2	0%	0.5	0.6
<i>Sphaeriidae</i>	0	0	1	0	1	0%	0.3	0.5
OTHER								0.0
Turbellaria	4	3	6	35	48	1%	12.0	15.4
TOTAL ORGANISMS	890	2071	2630	3540	9131		2283	1108
TAXA RICHNESS	23	27	30	30	45		28	3.3
SHAN. DIVERSITY	2.38	2.29	2.16	2.50	2.44		2.33	0.15
BIOTIC INDEX	4.85	4.91	5.15	4.94	4.99		4.96	0.13
EPT RICHNESS	11	14	10	13	18		12	1.8
% R.A. DOMINANT	40%	47%	41%	42%	41%		43%	3.3%
% R.A. FILTERERS	75%	75%	88%	74%	78%		78%	6.5%
METALS TOLERANCE	5.33	5.16	5.54	5.16	5.29		5.30	0.18
Baetidae/Ephemeroptera	0.94	0.99	1.00	1.00	0.99		0.98	0.03
Hydropsychinae/Trichoptera	0.99	0.98	1.00	0.99	0.99		0.99	0.01
EPT / (EPT + CHIR.)	0.98	0.94	0.94	0.91	0.93		0.94	0.03
ID's by D. McGuire								

MACROINVERTEBRATE DATA								
CLARK FORK RIVER above L. Blackfoot R. - STATION 10 - 11 AUG 92								
Taxon	sample1	sample2	sample3	sample4	SUM	%RA	MEAN	S. D.
COLEOPTERA						4%	47	
<i>Optioservus spp.</i>	14	23	45	33	115	3%	28.8	13.3
<i>Zaitzevia sp.</i>	13	22	26	12	73	2%	18.3	6.8
DIPTERA						9%	105	
<i>Thienemannimyia gp.</i>	1	1	5	2	9	0%	2.3	1.9
<i>Pentaneura sp.</i>	0	0	2	2	4	0%	1.0	1.2
<i>Pagastia sp</i>	1	0	0	0	1	0%	0.3	0.5
<i>Cricotopus spp.</i>	2	9	3	3	17	0%	4.3	3.2
<i>Cricotopus nostococladius</i>	0	0	0	2	2	0%	0.5	1.0
<i>Eukiefferiella spp.</i>	0	0	6	0	6	0%	1.5	3.0
<i>Orthocladius spp.</i>	9	18	14	13	54	1%	13.5	3.7
<i>Paraphaenocladius sp.</i>	0	0	0	1	1	0%	0.3	0.5
<i>Tvetenia sp.</i>	4	0	34	20	58	1%	14.5	15.6
<i>Polypedilum spp.</i>	23	11	36	58	128	3%	32.0	20.1
<i>Microtendipes sp</i>	2	3	20	23	48	1%	12.0	11.0
<i>Phaenopsectra sp</i>	1	0	2	3	6	0%	1.5	1.3
<i>Antocha sp.</i>	1	0	5	7	13	0%	3.3	3.3
<i>Hexatoma sp.</i>	2	3	2	0	7	0%	1.8	1.3
<i>Simulium (Psilozoa)</i>	8	10	7	39	64	1%	16.0	15.4
<i>Hemerodromia sp.</i>	1	0	1	0	2	0%	0.5	0.6
EPHEMEROPTERA						18%	201	
<i>Baetis tricaudatus</i>	33	56	147	474	710	16%	177.5	203.7
<i>Baetis punctiventris</i>	6	3	3	22	34	1%	8.5	9.1
<i>Attenella margarita</i>	1	0	0	0	1	0%	0.3	0.5
<i>Ephemerella inermis</i>	0	0	5	0	5	0%	1.3	2.5
<i>Rhithrogena sp.</i>	0	1	2	0	3	0%	0.8	1.0
<i>Tricorythodes minutus</i>	8	0	1	42	51	1%	12.8	19.8
LEPIDOPTERA								
<i>Petrophila sp.</i>	0	4	34	18	56	1%	14.0	15.4
ODONATA								
<i>Ophiogomphus sp.</i>	2	0	0	3	5	0%	1.3	1.5
PLECOPTERA						2%	22	
<i>Isogenoides sp.</i>	6	24	45	4	79	2%	19.8	19.1
<i>Skwala sp.</i>	1	1	3	2	7	0%	1.8	1.0
<i>Pteronarcella badia</i>	0	0	1	0	1	0%	0.3	0.5
<i>Isoperla fulva</i>	0	0	0	1	1	0%	0.3	0.5

MACROINVERTEBRATE DATA								
CLARK FORK RIVER above L. Blackfoot R. - STATION 10 - 11 AUG 92								
Taxon	sample1	sample2	sample3	sample4	SUM	%RA	MEAN	S. D.
TRICHOPTERA						65%	722	
<i>Cheumatopsyche</i> spp.	15	37	116	88	256	6%	64.0	46.2
<i>Hydropsyche occidentalis</i>	186	83	232	393	894	20%	223.5	129.0
<i>Hydropsyche cockerelli</i>	0	0	0	2	2	0%	0.5	1.0
<i>H. (Ceratopsyche) spp.?</i>	343	249	429	561	1582	35%	395.5	132.6
<i>Hydroptila</i> spp.	2	5	22	7	36	1%	9.0	8.9
<i>Ochrotrichia</i> sp.	1	1	2	1	5	0%	1.3	0.5
<i>Oecetis</i> sp.	2	9	36	20	67	2%	16.8	14.8
<i>Brachycentrus occidentalis</i>	2	0	4	5	11	0%	2.8	2.2
<i>Helicopsyche borealis</i>	2	0	0	10	12	0%	3.0	4.8
<i>Protophila</i> sp.	3	1	4	16	24	1%	6.0	6.8
ANNELIDA						0%	3	
Tubificidae	0	4	7	2	13	0%	3.3	3.0
MOLLUSCA						0%	1	
<i>Fossaria</i> sp.	1	0	0	0	1	0%	0.3	0.5
<i>Sphaeriidae</i>	0	0	0	1	1	0%	0.3	0.5
TOTAL ORGANISMS	696	578	1301	1890	4465		1116	605
TAXA RICHNESS	31	23	33	34	43		30	5.0
SHAN. DIVERSITY	2.46	2.97	3.33	2.97	3.13		2.93	0.36
BIOTIC INDEX	4.96	4.96	4.96	4.80	4.89		4.92	0.08
EPT RICHNESS	15	12	16	16	20		15	1.9
% R.A. DOMINANT	49%	43%	33%	30%	35%		39%	9.0%
% R.A. FILTERERS	80%	66%	61%	58%	63%		66%	9.8%
METALS TOLERANCE	5.36	5.27	5.00	5.13	5.14		5.19	0.16
Baetidae/Ephemeroptera	0.81	0.98	0.95	0.92	0.93		0.92	0.07
Hydropsychinae/Trichoptera	0.98	0.96	0.92	0.95	0.95		0.95	0.02
EPT / (EPT + CHIR.)	0.93	0.92	0.90	0.93	0.92		0.92	0.02
ID's by D. McGuire								

MACROINVERTEBRATE DATA								
CLARK FORK RIVER @ Gold Creek Br. - STATION 11 - 11 AUG 92								
Taxon	sample1	sample2	sample3	sample4	SUM	%RA	MEAN	S. D.
COLEOPTERA						5%	97	
<i>Optioservus spp.</i>	55	52	47	20	174	2%	43.5	16.0
<i>Zaitzevia sp.</i>	63	18	118	15	214	3%	53.5	48.3
DIPTERA						61%	1086	
<i>Thienemannimyia gp.</i>	14	13	39	23	89	1%	22.3	12.0
<i>Pentaneura sp.</i>	4	0	16	8	28	0%	7.0	6.8
<i>Cardiocladius spp.</i>	8	1	2	0	11	0%	2.8	3.6
<i>Cricotopus spp.</i>	14	48	65	17	144	2%	36.0	24.7
<i>Eukiefferiella spp.</i>	77	22	20	5	124	2%	31.0	31.6
<i>Orthocladius spp.</i>	3	2	50	19	74	1%	18.5	22.4
<i>Paraphaenocladius sp.</i>	3	1	11	0	15	0%	3.8	5.0
<i>Nanocladius sp.</i>	1	0	0	0	1	0%	0.3	0.5
<i>Tvetenia sp.</i>	39	4	81	5	129	2%	32.3	36.3
<i>Chironomus sp.</i>	0	0	0	1	1	0%	0.3	0.5
<i>Endochironomus sp.</i>	0	9	1	36	46	1%	11.5	16.8
<i>Polypedilum spp.</i>	73	91	653	38	855	12%	213.8	293.7
<i>Microtendipes sp</i>	30	5	8	19	62	1%	15.5	11.4
<i>Phaenopsectra sp</i>	1	0	0	0	1	0%	0.3	0.5
<i>Tanytarsus sp.</i>	0	0	0	1	1	0%	0.3	0.5
<i>Micropsectra spp.</i>	1	0	0	0	1	0%	0.3	0.5
<i>Antocha sp.</i>	1	0	6	0	7	0%	1.8	2.9
<i>Hexatoma sp.</i>	7	8	5	3	23	0%	5.8	2.2
<i>Simulium (Psilozoa)</i>	603	366	1465	279	2713	38%	678.3	542.1
<i>Hemerodromia sp.</i>	2	1	10	5	18	0%	4.5	4.0
EPHEMEROPTERA						12%	219	
<i>Ameletus sp.</i>	0	1	0	0	1	0%	0.3	0.5
<i>Baetis tricaudatus</i>	14	28	50	51	143	2%	35.8	18.0
<i>Baetis punctiventris</i>	6	6	16	51	79	1%	19.8	21.4
<i>Attenella margarita</i>	5	5	8	3	21	0%	5.3	2.1
<i>Ephemerella inermis</i>	8	2	45	0	55	1%	13.8	21.1
<i>Drunella grandis</i>	0	0	1	0	1	0%	0.3	0.5
<i>Heptagenia sp.</i>	0	0	1	0	1	0%	0.3	0.5
<i>Rhithrogena sp.</i>	3	0	10	1	14	0%	3.5	4.5
<i>Paraleptophlebia bicornuta</i>	0	0	1	0	1	0%	0.3	0.5
<i>Tricorythodes minutus</i>	49	129	131	252	561	8%	140.3	83.7
LEPIDOPTERA								
<i>Petrophila sp.</i>	2	1	2	1	6	0%	1.5	0.6

MACROINVERTEBRATE DATA								
CLARK FORK RIVER @ Gold Creek Br. - STATION 11 - 11 AUG 92								
Taxon	sample1	sample2	sample3	sample4	SUM	%RA	MEAN	S. D.
PLECOPTERA						0%	3	
<i>Claassenia sabulosa</i>	1	0	0	1	2	0%	0.5	0.6
<i>Hesperoperla pacifica</i>	1	1	1	0	3	0%	0.8	0.5
<i>Isogenoides sp.</i>	1	0	0	0	1	0%	0.3	0.5
<i>Pteronarcella badia</i>	3	0	2	0	5	0%	1.3	1.5
<i>Isoperla fulva</i>	1	0	0	0	1	0%	0.3	0.5
Chloroperlinae	1	0	0	0	1	0%	0.3	0.5
TRICHOPTERA						20%	363	
<i>Cheumatopsyche spp.</i>	9	13	9	17	48	1%	12.0	3.8
<i>Hydropsyche occidentalis</i>	77	89	585	47	798	11%	199.5	257.6
<i>H. (Ceratopsyche) spp.?</i>	19	11	60	13	103	1%	25.8	23.1
<i>Hydroptila spp.</i>	101	35	21	38	195	3%	48.8	35.6
<i>Ochrotrichia sp.</i>	61	20	18	11	110	2%	27.5	22.7
<i>Nectopsyche sp.</i>	1	0	0	6	7	0%	1.8	2.9
<i>Oecetis sp.</i>	19	51	48	48	166	2%	41.5	15.1
<i>Helicopsyche borealis</i>	11	0	5	3	19	0%	4.8	4.6
<i>Protophila sp.</i>	3	0	0	2	5	0%	1.3	1.5
ANNELIDA						0%	3	
Naididae	0	0	5	0	5	0%	1.3	2.5
Tubificidae	2	0	0	4	6	0%	1.5	1.9
MOLLUSCA						0%	1	
<i>Physella sp.</i>	0	0	0	3	3	0%	0.8	1.5
<i>Fossaria sp.</i>	1	0	0	0	1	0%	0.3	0.5
OTHER								0.0
Turbellaria	8	2	11	8	29	0%	7.3	3.8
TOTAL ORGANISMS	1406	1035	3627	1054	7122		1781	1243
TAXA RICHNESS	44	30	38	35	53		37	5.9
SHAN. DIVERSITY	3.42	3.39	2.98	3.65	3.44		3.36	0.28
BIOTIC INDEX	6.03	5.96	5.98	5.74	5.95		5.93	0.13
EPT RICHNESS	21	13	18	15	25		17	3.5
% R.A. DOMINANT	43%	35%	40%	26%	38%		36%	7.2%
% R.A. FILTERERS	50%	46%	58%	34%	51%		47%	10.3%
METALS TOLERANCE	5.71	5.56	5.54	4.99	5.49		5.45	0.32
Baetidae/Ephemeroptera	0.24	0.20	0.25	0.28	0.25		0.24	0.04
Hydropsychinae/Trichoptera	0.35	0.52	0.88	0.42	0.65		0.54	0.24
EPT / (EPT + CHIR.)	0.60	0.67	0.52	0.76	0.60		0.63	0.10
ID's by D. McGuire								

MACROINVERTEBRATE DATA								
CLARK FORK RIVER @ Bonita - STATION 12 - 10 AUG 92								
Taxon	sample1	sample2	sample3	sample4	SUM	%RA	MEAN	S. D.
COLEOPTERA						9%	306	
<i>Optioservus spp.</i>	25	120	191	192	528	4%	132.0	78.9
<i>Zaitzevia sp.</i>	54	164	214	263	695	5%	173.8	89.5
DIPTERA						24%	856	
<i>Thienemannimyia gp.</i>	2	5	3	10	20	0%	5.0	3.6
<i>Pentaneura sp.</i>	0	3	20	0	23	0%	5.8	9.6
<i>Cardiocladius spp.</i>	1	15	0	13	29	0%	7.3	7.8
<i>Corynoneura sp</i>	0	2	0	20	22	0%	5.5	9.7
<i>Cricotopus spp.</i>	2	10	0	31	43	0%	10.8	14.2
<i>Cricotopus nostococladius</i>	0	1	0	0	1	0%	0.3	0.5
<i>Eukiefferiella spp.</i>	0	98	58	73	229	2%	57.3	41.6
<i>Orthocladius spp.</i>	5	35	31	86	157	1%	39.3	33.9
<i>Paraphaenocladius sp.</i>	0	4	0	0	4	0%	1.0	2.0
<i>Tvetenia sp.</i>	2	68	22	44	136	1%	34.0	28.4
<i>Polypedilum spp.</i>	39	353	219	556	1167	8%	291.8	218.1
<i>Microtendipes sp</i>	0	0	38	10	48	0%	12.0	18.0
<i>Phaenopsectra sp</i>	0	1	0	0	1	0%	0.3	0.5
<i>Cladotanytarsus sp.</i>	0	0	2	0	2	0%	0.5	1.0
<i>Rheotanytarsus sp.</i>	0	0	4	0	4	0%	1.0	2.0
<i>Micropsectra spp.</i>	0	15	1	1	17	0%	4.3	7.2
<i>Antocha sp.</i>	0	0	1	2	3	0%	0.8	1.0
<i>Hexatoma sp.</i>	1	6	2	5	14	0%	3.5	2.4
<i>Atherix pachypus</i>	2	2	1	3	8	0%	2.0	0.8
<i>Simulium (Psilozoa)</i>	223	547	268	443	1481	10%	370.3	151.3
<i>Hemerodromia sp.</i>	0	2	14	0	16	0%	4.0	6.7
EPHEMEROPTERA						10%	366	
<i>Acentrella insignificans</i>	1	0	0	0	1	0%	0.3	0.5
<i>Baetis tricaudatus</i>	116	366	273	537	1292	9%	323.0	176.1
<i>Baetis punctiventris</i>	8	43	53	28	132	1%	33.0	19.6
<i>Serratella tibialis</i>	1	0	0	0	1	0%	0.3	0.5
<i>Ephemerella inermis</i>	0	1	0	0	1	0%	0.3	0.5
<i>Drunella grandis</i>	0	2	5	1	8	0%	2.0	2.2
<i>Heptagenia sp.</i>	0	0	1	0	1	0%	0.3	0.5
<i>Nixe sp.</i>	0	0	4	0	4	0%	1.0	2.0
<i>Rhithrogena sp.</i>	0	1	0	0	1	0%	0.3	0.5
<i>Paraleptophlebia bicornuta</i>	0	0	1	0	1	0%	0.3	0.5
<i>Tricorythodes minutus</i>	0	0	10	10	20	0%	5.0	5.8
LEPIDOPTERA								
<i>Petrophila sp.</i>	3	3	9	3	18	0%	4.5	3.0
ODONATA								
<i>Ophiogomphus sp.</i>	3	0	4	8	15	0%	3.8	3.3

MACROINVERTEBRATE DATA								
CLARK FORK RIVER @ Bonita - STATION 12 - 10 AUG 92								
Taxon	sample1	sample2	sample3	sample4	SUM	%RA	MEAN	S. D.
PLECOPTERA						0%	11	
<i>Claassenia sabulosa</i>	4	11	2	5	22	0%	5.5	3.9
<i>Isogenoides sp.</i>	0	0	3	1	4	0%	1.0	1.4
<i>Pteronarcella badia</i>	6	5	1	0	12	0%	3.0	2.9
<i>Pteronarcys californica</i>	0	0	5	1	6	0%	1.5	2.4
<i>Isoperla fulva</i>	0	1	0	0	1	0%	0.3	0.5
TRICHOPTERA						56%	2005	
<i>Cheumatopsyche spp.</i>	31	22	59	85	197	1%	49.3	28.6
<i>Hydropsyche occidentalis</i>	1847	2379	1165	2123	7514	53%	1878.5	522.9
<i>Hydropsyche cockerelli</i>	27	33	21	21	102	1%	25.5	5.7
<i>Hydroptila spp.</i>	4	5	13	0	22	0%	5.5	5.4
<i>Neotrichia sp.</i>	1	0	0	0	1	0%	0.3	0.5
<i>Ochrotrichia sp.</i>	4	35	22	22	83	1%	20.8	12.7
<i>Nectopsyche sp.</i>	0	10	13	1	24	0%	6.0	6.5
<i>Oecetis sp.</i>	0	25	20	30	75	1%	18.8	13.1
ANNELIDA						0%	2	
Naididae	0	0	4	0	4	0%	1.0	2.0
Tubificidae	0	0	3	0	3	0%	0.8	1.5
MOLLUSCA						0%	2	
<i>Physella sp.</i>	0	0	6	0	6	0%	1.5	3.0
OTHER								0.0
Turbellaria	0	2	8	6	16	0%	4.0	3.7
TOTAL ORGANISMS	2412	4395	2794	4634	14235		3559	1119
TAXA RICHNESS	25	36	41	32	53		34	6.8
SHAN. DIVERSITY	1.46	2.52	3.15	2.77	2.64		2.47	0.73
BIOTIC INDEX	5.11	5.29	5.22	5.23	5.23		5.21	0.07
EPT RICHNESS	12	15	18	13	24		15	2.6
% R.A. DOMINANT	77%	54%	42%	46%	53%		55%	15.6%
% R.A. FILTERERS	88%	68%	54%	58%	65%		67%	15.3%
METALS TOLERANCE	5.13	5.16	4.99	5.08	5.10		5.09	0.07
Baetidae/Ephemeroptera	0.99	0.99	0.94	0.98	0.97		0.98	0.02
Hydropsychinae/Trichoptera	1.00	0.97	0.95	0.98	0.97		0.97	0.02
EPT / (EPT + CHIR.)	0.98	0.83	0.81	0.77	0.83		0.85	0.09
ID's by D. McGuire								

MACROINVERTEBRATE DATA								
CLARK FORK RIVER @ Turah - STATION 13 - 10 AUG 92								
Taxon	sample1	sample2	sample3	sample4	SUM	%RA	MEAN	S. D.
COLEOPTERA						8%	216	
<i>Optioservus spp.</i>	65	78	56	63	262	2%	65.5	9.2
<i>Zaitzevia sp.</i>	95	259	128	117	599	5%	149.8	74.1
<i>Ordobrevia sp.</i>	1	0	0	0	1	0%	0.3	0.5
DIPTERA						39%	1080	
<i>Pagastia sp</i>	1	0	0	1	2	0%	0.5	0.6
<i>Potthastia gaeddi gp.</i>	1	0	0	0	1	0%	0.3	0.5
<i>Cardiocladius spp.</i>	9	126	45	26	206	2%	51.5	51.8
<i>Corynoneura sp</i>	0	1	0	0	1	0%	0.3	0.5
<i>Cricotopus spp.</i>	59	428	43	36	566	5%	141.5	191.2
<i>Cricotopus nostococladius</i>	2	10	1	15	28	0%	7.0	6.7
<i>Eukiefferiella spp.</i>	5	82	5	20	112	1%	28.0	36.7
<i>Eukiefferiella devonica gp.</i>	0	20	0	5	25	0%	6.3	9.5
<i>Thienemanniella sp.</i>	0	4	0	0	4	0%	1.0	2.0
<i>Orthocladius spp.</i>	16	15	5	12	48	0%	12.0	5.0
<i>Paraphaenocladius sp.</i>	7	15	1	1	24	0%	6.0	6.6
<i>Synorthocladius sp.</i>	0	0	1	0	1	0%	0.3	0.5
<i>Tvetenia sp.</i>	50	354	31	69	504	5%	126.0	152.8
<i>Polypedilum spp.</i>	75	329	41	74	519	5%	129.8	133.8
<i>Microtendipes sp</i>	3	0	0	0	3	0%	0.8	1.5
<i>Phaenopsectra sp</i>	0	0	0	1	1	0%	0.3	0.5
<i>Rheotanytarsus sp.</i>	39	76	58	16	189	2%	47.3	25.7
<i>Tanytarsus sp.</i>	0	0	0	1	1	0%	0.3	0.5
<i>Micropsectra spp.</i>	71	168	104	63	406	4%	101.5	47.8
<i>Antocha sp.</i>	3	6	8	5	22	0%	5.5	2.1
<i>Hexatoma sp.</i>	14	17	12	10	53	0%	13.3	3.0
<i>Atherix pachypus</i>	0	3	0	0	3	0%	0.8	1.5
<i>Simulium (Eusimulium)</i>	16	1368	93	117	1594	14%	398.5	647.8
<i>Hemerodromia sp.</i>	1	2	1	0	4	0%	1.0	0.8
<i>Limnophora sp.</i>	0	1	0	0	1	0%	0.3	0.5
EPHEMEROPTERA						9%	236	
<i>Acentrella insignificans</i>	28	77	73	41	219	2%	54.8	24.0
<i>Baetis tricaudatus</i>	88	206	46	269	609	6%	152.3	103.2
<i>Baetis punctiventris</i>	0	0	0	1	1	0%	0.3	0.5
<i>Attenella margarita</i>	10	2	0	8	20	0%	5.0	4.8
<i>Serratella tibialis</i>	5	12	4	6	27	0%	6.8	3.6
<i>Ephemerella inermis</i>	2	0	0	2	4	0%	1.0	1.2
<i>Drunella grandis</i>	10	4	5	6	25	0%	6.3	2.6
<i>Epeorus albertae</i>	0	0	1	0	1	0%	0.3	0.5
<i>Heptagenia sp.</i>	0	0	1	0	1	0%	0.3	0.5
<i>Nixe sp.</i>	0	1	0	0	1	0%	0.3	0.5
<i>Rhithrogena sp.</i>	9	0	2	22	33	0%	8.3	9.9
<i>Paraleptophlebia sp.</i>	0	0	1	0	1	0%	0.3	0.5
<i>Tricorythodes minutus</i>	1	0	0	1	2	0%	0.5	0.6

MACROINVERTEBRATE DATA								
CLARK FORK RIVER @ Turah - STATION 13 - 10 AUG 92								
Taxon	sample1	sample2	sample3	sample4	SUM	%RA	MEAN	S. D.
LEPIDOPTERA								
<i>Petrophila sp.</i>	5	10	15	2	32	0%	8.0	5.7
ODONATA								
<i>Ophiogomphus sp.</i>	1	0	1	1	3	0%	0.8	0.5
PLECOPTERA						1%	24	
<i>Claassenia sabulosa</i>	6	8	5	5	24	0%	6.0	1.4
<i>Hesperoperla pacifica</i>	3	8	2	4	17	0%	4.3	2.6
<i>Isogenoides sp.</i>	0	2	2	3	7	0%	1.8	1.3
<i>Skwala sp.</i>	0	3	0	0	3	0%	0.8	1.5
<i>Pteronarcella badia</i>	0	9	0	1	10	0%	2.5	4.4
<i>Pteronarcys californica</i>	3	8	4	4	19	0%	4.8	2.2
<i>Isoperla fulva</i>	7	6	1	3	17	0%	4.3	2.8
TRICHOPTERA						43%	1180	
<i>Arctopsyche grandis</i>	10	42	13	21	86	1%	21.5	14.4
<i>Cheumatopsyche spp.</i>	21	63	81	21	186	2%	46.5	30.3
<i>Hydropsyche occidentalis</i>	657	1768	663	658	3746	34%	936.5	554.3
<i>Hydropsyche cockerelli</i>	68	219	122	56	465	4%	116.3	74.3
<i>Dicosmoecus sp.</i>	0	0	0	2	2	0%	0.5	1.0
<i>Hydroptila spp.</i>	3	20	15	20	58	1%	14.5	8.0
<i>Neotrichia sp.</i>	0	15	0	0	15	0%	3.8	7.5
<i>Ochrotrichia sp.</i>	2	26	1	12	41	0%	10.3	11.6
<i>Zumatrichia notosa</i>	0	1	3	0	4	0%	1.0	1.4
<i>Lepidostoma sp.</i>	0	0	0	1	1	0%	0.3	0.5
<i>Nectopsyche sp.</i>	0	1	0	0	1	0%	0.3	0.5
<i>Oecetis sp.</i>	6	20	11	18	55	0%	13.8	6.4
<i>Wormaldia sp.</i>	1	2	0	0	3	0%	0.8	1.0
<i>Psychomyia flavida</i>	0	0	0	1	1	0%	0.3	0.5
<i>Brachycentrus occidentalis</i>	2	1	9	1	13	0%	3.3	3.9
<i>Rhyacophila coloradensis gp</i>	0	0	1	1	2	0%	0.5	0.6
<i>Protophila sp.</i>	4	5	0	11	20	0%	5.0	4.5
<i>Glossosoma sp.</i>	2	2	12	5	21	0%	5.3	4.7
ANNELIDA						0%	8	
Tubificidae	5	25	1	0	31	0%	7.8	11.7
MOLLUSCA						0%	0	
<i>Gyraulus sp.</i>	1	0	0	0	1	0%	0.3	0.5
OTHER								0.0
Turbellaria	7	2	0	11	20	0%	5.0	5.0

MACROINVERTEBRATE DATA								
CLARK FORK RIVER @ Turah - STATION 13 - 10 AUG 92								
Taxon	sample1	sample2	sample3	sample4	SUM	%RA	MEAN	S. D.
TOTAL ORGANISMS	1500	5930	1728	1870	11028		2757	2121
TAXA RICHNESS	48	51	44	51	71		49	3.3
SHAN. DIVERSITY	3.46	3.44	3.57	3.70	3.66		3.54	0.12
BIOTIC INDEX	4.78	5.07	4.72	4.66	4.90		4.80	0.18
EPT RICHNESS	23	27	24	29	38		26	2.8
% R.A. DOMINANT	44%	30%	38%	35%	34%		37%	5.9%
% R.A. FILTERERS	54%	60%	60%	48%	57%		55%	5.9%
METALS TOLERANCE	4.57	5.06	4.51	4.63	4.84		4.69	0.25
Baetidae/Ephemeroptera	0.76	0.94	0.89	0.87	0.88		0.87	0.08
Hydropsychinae/Trichoptera	0.96	0.94	0.93	0.89	0.93		0.93	0.03
EPT / (EPT + CHIR.)	0.74	0.61	0.76	0.78	0.69		0.72	0.08
ID's by D. McGuire								

MACROINVERTEBRATE DATA								
BLACKFOOT RIVER @ USGS near mouth - STATION 14 - 10 AUG 92								
Taxon	sample1	sample2	sample3	sample4	SUM	%RA	MEAN	S. D.
COLEOPTERA						4%	42	
<i>Optioservus spp.</i>	23	15	18	28	84	2%	21.0	5.7
<i>Zaitzevia sp.</i>	12	39	11	20	82	2%	20.5	13.0
DIPTERA						77%	750	
<i>Thienemannimyia gp.</i>	0	5	0	13	18	0%	4.5	6.1
<i>Pagastia sp</i>	0	0	1	1	2	0%	0.5	0.6
<i>Potthastia gaeddi gp.</i>	0	25	1	3	29	1%	7.3	11.9
<i>Cardiocladius spp.</i>	0	7	0	2	9	0%	2.3	3.3
<i>Corynoneura sp</i>	1	0	0	1	2	0%	0.5	0.6
<i>Cricotopus spp.</i>	17	283	3	168	471	12%	117.8	133.1
<i>Eukiefferiella spp.</i>	10	6	1	3	20	1%	5.0	3.9
<i>Eukiefferiella devonica gp.</i>	2	0	1	0	3	0%	0.8	1.0
<i>Thienemanniella sp.</i>	0	0	0	1	1	0%	0.3	0.5
<i>Orthocladius spp.</i>	4	5	1	39	49	1%	12.3	17.9
<i>Paraphaenocladius sp.</i>	1	0	1	0	2	0%	0.5	0.6
<i>Tvetenia sp.</i>	3	0	0	0	3	0%	0.8	1.5
<i>Polypedilum spp.</i>	7	35	23	100	165	4%	41.3	40.8
<i>Microtendipes sp</i>	1	1	0	0	2	0%	0.5	0.6
<i>Rheotanytarsus sp.</i>	1	0	0	4	5	0%	1.3	1.9
<i>Tanytarsus sp.</i>	0	0	1	0	1	0%	0.3	0.5
<i>Micropsectra spp.</i>	261	712	422	796	2191	56%	547.8	249.4
<i>Antocha sp.</i>	3	2	0	4	9	0%	2.3	1.7
<i>Hexatoma sp.</i>	6	3	6	3	18	0%	4.5	1.7
EPHEMEROPTERA						5%	51	
<i>Acentrella insignificans</i>	6	2	3	9	20	1%	5.0	3.2
<i>Baetis tricaudatus</i>	12	20	19	28	79	2%	19.8	6.6
<i>Serratella tibialis</i>	21	7	7	16	51	1%	12.8	6.9
<i>Ephemerella inermis</i>	1	0	0	0	1	0%	0.3	0.5
<i>Drunella grandis</i>	3	5	3	4	15	0%	3.8	1.0
<i>Epeorus albertae</i>	3	0	3	1	7	0%	1.8	1.5
<i>Rhithrogena sp.</i>	7	6	3	13	29	1%	7.3	4.2
<i>Tricorythodes minutus</i>	0	0	0	1	1	0%	0.3	0.5
LEPIDOPTERA								
<i>Petrophila sp.</i>	1	1	2	1	5	0%	1.3	0.5
PLECOPTERA						2%	24	
<i>Claassenia sabulosa</i>	12	5	7	1	25	1%	6.3	4.6
<i>Hesperoperla pacifica</i>	0	2	0	0	2	0%	0.5	1.0
<i>Calineuria californica</i>	7	8	8	14	37	1%	9.3	3.2
<i>Skwala sp.</i>	8	2	1	4	15	0%	3.8	3.1
<i>Pteronarcys californica</i>	0	2	2	1	5	0%	1.3	1.0
<i>Isoperla fulva</i>	0	0	0	1	1	0%	0.3	0.5
Chloroperlinae	2	1	0	8	11	0%	2.8	3.6

MACROINVERTEBRATE DATA								
BLACKFOOT RIVER @ USGS near mouth - STATION 14 - 10 AUG 92								
Taxon	sample1	sample2	sample3	sample4	SUM	%RA	MEAN	S. D.
TRICHOPTERA						8%	75	
<i>Arctopsyche grandis</i>	4	3	0	3	10	0%	2.5	1.7
<i>Cheumatopsyche</i> spp.	7	8	2	3	20	1%	5.0	2.9
<i>Hydropsyche occidentalis</i>	18	11	6	3	38	1%	9.5	6.6
<i>Hydropsyche cockerelli</i>	9	32	10	12	63	2%	15.8	10.9
<i>Hydropsyche oslari</i>	32	32	15	28	107	3%	26.8	8.1
<i>Dicosmoecus</i> sp.	2	1	0	0	3	0%	0.8	1.0
<i>Zumatrichia notosa</i>	3	0	0	0	3	0%	0.8	1.5
<i>Nectopsyche</i> sp.	0	0	0	1	1	0%	0.3	0.5
<i>Lepidostoma</i> sp.	2	1	0	1	4	0%	1.0	0.8
<i>Wormaldia</i> sp.	0	0	1	2	3	0%	0.8	1.0
<i>Psychomyia flavida</i>	1	5	1	1	8	0%	2.0	2.0
<i>Brachycentrus occidentalis</i>	1	1	0	1	3	0%	0.8	0.5
<i>Rhyacophila angelita</i> gp.	0	2	1	4	7	0%	1.8	1.7
<i>Rhyacophila coloradensis</i> gp	1	0	0	0	1	0%	0.3	0.5
<i>Helicopsyche borealis</i>	0	1	0	1	2	0%	0.5	0.6
<i>Protoptila</i> sp.	0	0	1	0	1	0%	0.3	0.5
<i>Glossosoma</i> sp.	5	7	4	9	25	1%	6.3	2.2
ANNELIDA						0%	5	
Lumbriculidae	0	2	0	2	4	0%	1.0	1.2
Naididae	0	0	0	1	1	0%	0.3	0.5
Tubificidae	1	0	11	1	13	0%	3.3	5.2
MOLLUSCA						3%	28	
<i>Physella</i> sp.	8	39	24	38	109	3%	27.3	14.5
<i>Ferrissia</i> sp.	0	1	0	0	1	0%	0.3	0.5
<i>Sphaeriidae</i>	0	0	3	0	3	0%	0.8	1.5
OTHER								0.0
Turbellaria	0	1	0	0	1	0%	0.3	0.5
TOTAL ORGANISMS	529	1346	627	1399	3901		975	461
TAXA RICHNESS	41	41	36	47	61		41	4.5
SHAN. DIVERSITY	3.37	2.61	2.35	2.67	2.85		2.75	0.44
BIOTIC INDEX	3.98	4.68	4.21	4.52	4.45		4.35	0.31
EPT RICHNESS	23	23	19	26	32		23	2.9
% R.A. DOMINANT	49%	53%	67%	57%	56%		57%	7.8%
% R.A. FILTERERS	14%	6%	5%	4%	6%		7%	4.3%
METALS TOLERANCE	2.71	3.74	2.01	2.97	3.05		2.86	0.72
Baetidae/Ephemeroptera	0.34	0.55	0.58	0.51	0.49		0.50	0.11
Hydropsychinae/Trichoptera	0.80	0.81	0.80	0.67	0.77		0.77	0.07
EPT / (EPT + CHIR.)	0.35	0.13	0.18	0.13	0.17		0.20	0.10
ID's by D. McGuire								

MACROINVERTEBRATE DATA								
CLARK FORK RIVER above Missoula - STATION 15.5 - 10 AUG 92								
Taxon	sample1	sample2	sample3	sample4	SUM	%RA	MEAN	S. D.
COLEOPTERA						7%	125	
<i>Optioservus</i> spp.	9	11	16	20	56	1%	14.0	5.0
<i>Zaitzevia</i> sp.	83	179	126	40	428	6%	107.0	59.5
<i>Ordobrevia</i> sp.	12	3	1	0	16	0%	4.0	5.5
DIPTERA						42%	764	
<i>Thienemannimyia</i> gp.	1	2	1	0	4	0%	1.0	0.8
<i>Pagastia</i> sp	0	0	0	1	1	0%	0.3	0.5
<i>Cardiocladius</i> spp.	24	230	65	47	366	5%	91.5	93.8
<i>Cricotopus</i> spp.	40	257	242	130	669	9%	167.3	102.0
<i>Eukiefferiella</i> spp.	8	42	105	21	176	2%	44.0	43.0
<i>Eukiefferiella devonica</i> gp.	3	158	83	25	269	4%	67.3	69.3
<i>Orthocladius</i> spp.	1	10	1	2	14	0%	3.5	4.4
<i>Synorthocladius</i> sp.	0	0	0	1	1	0%	0.3	0.5
<i>Tvetenia</i> sp.	3	42	35	15	95	1%	23.8	18.0
<i>Polypedilum</i> spp.	21	172	78	133	404	5%	101.0	65.8
<i>Microtendipes</i> sp	2	5	0	1	8	0%	2.0	2.2
<i>Rheotanytarsus</i> sp.	8	6	6	12	32	0%	8.0	2.8
<i>Micropsectra</i> spp.	41	74	82	27	224	3%	56.0	26.2
<i>Antocha</i> sp.	1	1	0	0	2	0%	0.5	0.6
<i>Simulium</i> (<i>Eusimulium</i>)	4	323	236	227	790	11%	197.5	136.1
Empididae	2	0	0	0	2	0%	0.5	1.0
EPHEMEROPTERA						6%	112	
<i>Acentrella insignificans</i>	16	31	15	20	82	1%	20.5	7.3
<i>Baetis tricaudatus</i>	14	98	84	159	355	5%	88.8	59.5
<i>Drunella grandis</i>	0	0	1	1	2	0%	0.5	0.6
<i>Serratella tibialis</i>	2	0	0	1	3	0%	0.8	1.0
<i>Epeorus albertae</i>	2	2	0	0	4	0%	1.0	1.2
<i>Rhithrogena</i> sp.	1	0	0	0	1	0%	0.3	0.5
LEPIDOPTERA								
<i>Petrophila</i> sp.	0	1	1	1	3	0%	0.8	0.5
PLECOPTERA						1%	23	
<i>Claassenia sabulosa</i>	17	18	5	3	43	1%	10.8	7.8
<i>Hesperoperla pacifica</i>	4	8	4	2	18	0%	4.5	2.5
<i>Calineuria californica</i>	1	1	1	2	5	0%	1.3	0.5
<i>Isogenoides</i> sp.	5	1	0	0	6	0%	1.5	2.4
<i>Skwala</i> sp.	1	1	3	1	6	0%	1.5	1.0
<i>Pteronarcys californica</i>	1	6	2	1	10	0%	2.5	2.4
<i>Isoperla fulva</i>	0	1	0	0	1	0%	0.3	0.5
Chloroperlinae	0	1	0	0	1	0%	0.3	0.5

MACROINVERTEBRATE DATA								
CLARK FORK RIVER above Missoula - STATION 15.5 - 10 AUG 92								
Taxon	sample1	sample2	sample3	sample4	SUM	%RA	MEAN	S. D.
TRICHOPTERA						44%	814	
<i>Arctopsyche grandis</i>	12	36	2	43	93	1%	23.3	19.4
<i>Cheumatopsyche spp.</i>	119	353	157	187	816	11%	204.0	103.2
<i>Hydropsyche occidentalis</i>	203	695	458	344	1700	23%	425.0	208.0
<i>Hydropsyche cockerelli</i>	58	186	68	97	409	6%	102.3	58.2
<i>Hydropsyche oslari</i>	0	1	0	0	1	0%	0.3	0.5
<i>Hydroptila spp.</i>	0	1	10	0	11	0%	2.8	4.9
<i>Leucotrichia pictipes</i>	5	0	5	0	10	0%	2.5	2.9
<i>Zumatrichia notosa</i>	16	33	24	21	94	1%	23.5	7.1
<i>Oecetis sp.</i>	2	15	26	1	44	1%	11.0	11.9
<i>Wormaldia sp.</i>	0	2	1	1	4	0%	1.0	0.8
<i>Psychomyia flavida</i>	6	9	11	29	55	1%	13.8	10.4
<i>Brachycentrus occidentalis</i>	1	1	1	0	3	0%	0.8	0.5
<i>Rhyacophila colradensis</i>	1	1	4	5	11	0%	2.8	2.1
<i>Glossosoma sp.</i>	3	0	1	0	4	0%	1.0	1.4
ANNELIDA						0%	1	
Lumbriculidae	0	2	1	0	3	0%	0.8	1.0
Naididae	0	1	0	0	1	0%	0.3	0.5
MOLLUSCA						0%	0	
<i>Ferrissia sp.</i>	0	1	0	0	1	0%	0.3	0.5
OTHER								0.0
Turbellaria	1	2	2	1	6	0%	1.5	0.6
TOTAL ORGANISMS	754	3023	1964	1622	7363		1841	938
TAXA RICHNESS	40	44	38	35	52		39	3.8
SHAN. DIVERSITY	3.76	3.74	3.76	3.69	3.84		3.73	0.03
BIOTIC INDEX	4.62	5.15	5.34	4.92	5.10		5.01	0.31
EPT RICHNESS	22	23	21	18	28		21	2.2
% R.A. DOMINANT	27%	23%	23%	21%	23%		24%	2.4%
% R.A. FILTERERS	54%	53%	47%	56%	52%		53%	3.8%
METALS TOLERANCE	4.65	5.37	5.53	5.04	5.27		5.15	0.39
Baetidae/Ephemeroptera	0.86	0.98	0.99	0.99	0.98		0.96	0.07
Hydropsychinae/Trichoptera	0.89	0.93	0.89	0.86	0.90		0.89	0.03
EPT / (EPT + CHIR.)	0.76	0.60	0.56	0.69	0.63		0.65	0.09
ID's by D. McGuire								

MACROINVERTEBRATE DATA								
CLARK FORK RIVER @ Shuffield's - STATION 18 - 11 AUG 92								
Taxon	sample1	sample2	sample3	sample4	SUM	%RA	MEAN	S. D.
COLEOPTERA						0%	6	
<i>Optioservus spp.</i>	6	7	3	1	17	0%	4.3	2.8
<i>Zaitzevia sp.</i>	3	0	2	2	7	0%	1.8	1.3
DIPTERA						9%	135	
<i>Thienemannimyia gp.</i>	3	0	0	5	8	0%	2.0	2.4
<i>Pagastia sp</i>	0	0	5	0	5	0%	1.3	2.5
<i>Potthastia gaeddi gp.</i>	0	1	0	10	11	0%	2.8	4.9
<i>Cardiocladius spp.</i>	15	16	5	32	68	1%	17.0	11.2
<i>Cricotopus spp.</i>	28	29	68	59	184	3%	46.0	20.5
<i>Cricotopus nostococladius</i>	2	0	1	1	4	0%	1.0	0.8
<i>Eukiefferiella spp.</i>	0	0	12	5	17	0%	4.3	5.7
<i>Eukiefferiella devonica gp.</i>	1	5	0	0	6	0%	1.5	2.4
<i>Nanocladius sp.</i>	0	0	5	1	6	0%	1.5	2.4
<i>Rheocricotopus sp.</i>	0	1	0	0	1	0%	0.3	0.5
<i>Tvetenia sp.</i>	4	5	6	0	15	0%	3.8	2.6
<i>Polypedilum spp.</i>	36	29	20	16	101	2%	25.3	9.0
<i>Microtendipes sp</i>	0	0	0	5	5	0%	1.3	2.5
<i>Phaenopsectra sp</i>	2	1	0	0	3	0%	0.8	1.0
<i>Rheotanytarsus sp.</i>	16	4	22	12	54	1%	13.5	7.5
<i>Micropsectra spp.</i>	3	14	18	6	41	1%	10.3	6.9
<i>Antocha sp.</i>	0	2	0	0	2	0%	0.5	1.0
<i>Simulium (Eusimulium)</i>	2	0	5	0	7	0%	1.8	2.4
Empididae	0	0	0	1	1	0%	0.3	0.5
<i>Protanyderus sp.</i>	1	0	1	0	2	0%	0.5	0.6
EPHEMEROPTERA						4%	60	
<i>Acentrella insignificans</i>	14	13	17	16	60	1%	15.0	1.8
<i>Baetis tricaudatus</i>	26	26	37	11	100	2%	25.0	10.7
<i>Attenella margarita</i>	1	0	0	0	1	0%	0.3	0.5
<i>Ephemerella inermis</i>	0	0	1	0	1	0%	0.3	0.5
<i>Drunella grandis</i>	2	0	0	0	2	0%	0.5	1.0
<i>Heptagenia sp.</i>	1	0	1	0	2	0%	0.5	0.6
<i>Nixe sp.</i>	6	0	16	10	32	1%	8.0	6.7
<i>Rhithrogena sp.</i>	2	8	0	5	15	0%	3.8	3.5
<i>Tricorythodes minutus</i>	1	7	6	12	26	0%	6.5	4.5
HEMIPTERA								
<i>Sigara sp.</i>	1	10	0	0	11	0%	2.8	4.9
LEPIDOPTERA								
<i>Petrophila sp.</i>	78	37	72	72	259	4%	64.8	18.7

MACROINVERTEBRATE DATA								
CLARK FORK RIVER @ Shuffield's - STATION 18 - 11 AUG 92								
Taxon	sample1	sample2	sample3	sample4	SUM	%RA	MEAN	S. D.
PLECOPTERA						1%	14	
<i>Claassenia sabulosa</i>	4	7	1	1	13	0%	3.3	2.9
<i>Hesperoperla pacifica</i>	5	0	2	0	7	0%	1.8	2.4
<i>Isogenoides sp.</i>	2	7	7	4	20	0%	5.0	2.4
<i>Skwala sp.</i>	3	1	1	0	5	0%	1.3	1.3
<i>Pteronarcella badia</i>	3	0	0	0	3	0%	0.8	1.5
<i>Pteronarcys californica</i>	2	0	1	2	5	0%	1.3	1.0
<i>Isoperla fulva</i>	1	0	2	0	3	0%	0.8	1.0
TRICHOPTERA						81%	1257	
<i>Arctopsyche grandis</i>	61	40	89	35	225	4%	56.3	24.6
<i>Cheumatopsyche spp.</i>	426	335	410	271	1442	23%	360.5	71.6
<i>Hydropsyche occidentalis</i>	818	582	666	562	2628	43%	657.0	116.4
<i>Hydropsyche cockerelli</i>	12	12	45	22	91	1%	22.8	15.6
<i>Hydroptila spp.</i>	4	2	0	0	6	0%	1.5	1.9
<i>Leucotrichia pictipes</i>	8	9	10	15	42	1%	10.5	3.1
<i>Ochrotrichia sp.</i>	0	1	0	0	1	0%	0.3	0.5
<i>Zumatrichia notosa</i>	114	69	114	87	384	6%	96.0	22.0
<i>Neotrichia sp.</i>	0	0	1	0	1	0%	0.3	0.5
<i>Oecetis sp.</i>	11	29	17	40	97	2%	24.3	12.9
<i>Psychomyia flavida</i>	12	12	8	46	78	1%	19.5	17.8
<i>Brachycentrus occidentalis</i>	2	2	13	1	18	0%	4.5	5.7
<i>Protophila sp.</i>	3	1	0	0	4	0%	1.0	1.4
<i>Glossosoma sp.</i>	2	5	1	4	12	0%	3.0	1.8
ANNELIDA						0%	3	
Naididae	0	0	0	5	5	0%	1.3	2.5
Tubificidae	0	0	0	7	7	0%	1.8	3.5
MOLLUSCA						0%	0	
<i>Physella sp.</i>	0	0	1	0	1	0%	0.3	0.5
TOTAL ORGANISMS	1747	1329	1712	1384	6172		1543	217
TAXA RICHNESS	43	34	39	35	57		38	4.1
SHAN. DIVERSITY	2.67	2.86	3.04	3.16	3.00		2.93	0.21
BIOTIC INDEX	4.72	4.77	4.69	4.78	4.74		4.74	0.04
EPT RICHNESS	27	20	23	18	30		22	3.9
% R.A. DOMINANT	47%	44%	39%	41%	43%		43%	3.5%
% R.A. FILTERERS	77%	73%	73%	65%	72%		72%	4.8%
METALS TOLERANCE	4.41	4.49	4.38	4.45	4.43		4.43	0.05
Baetidae/Ephemeroptera	0.75	0.72	0.69	0.50	0.67		0.67	0.11
Hydropsychinae/Trichoptera	0.85	0.85	0.82	0.79	0.83		0.83	0.03
EPT / (EPT + CHIR.)	0.93	0.92	0.90	0.88	0.91		0.91	0.02
ID's by D. McGuire								

MACROINVERTEBRATE DATA								
BITTERROOT RIVER nr month - STATION 19 - 11 AUG 92								
Taxon	sample1	sample2	sample3	sample4	SUM	%RA	MEAN	S. D.
COLEOPTERA						7%	93	
<i>Optioservus spp.</i>	41	117	36	46	240	4%	60.0	38.2
<i>Zaitzevia sp.</i>	26	50	32	23	131	2%	32.8	12.1
DIPTERA						47%	662	
<i>Thienemannimyia gp.</i>	0	0	1	0	1	0%	0.3	0.5
<i>Pagastia sp</i>	2	2	0	1	5	0%	1.3	1.0
<i>Potthastia gaeddi gp.</i>	1	0	1	0	2	0%	0.5	0.6
<i>Potthastia longimanus gp.</i>	0	0	0	1	1	0%	0.3	0.5
<i>Cardiocladius spp.</i>	9	27	36	11	83	1%	20.8	13.0
<i>Cricotopus spp.</i>	61	91	86	121	359	6%	89.8	24.6
<i>Eukiefferiella spp.</i>	3	4	17	6	30	1%	7.5	6.5
<i>Eukiefferiella devonica gp.</i>	1	0	10	0	11	0%	2.8	4.9
<i>Nanocladius sp.</i>	0	0	0	2	2	0%	0.5	1.0
<i>Tvetenia sp.</i>	1	1	2	10	14	0%	3.5	4.4
<i>Polypedilum spp.</i>	47	95	48	116	306	5%	76.5	34.6
<i>Rheotanytarsus sp.</i>	100	135	90	82	407	7%	101.8	23.4
<i>Micropsectra spp.</i>	2	1	2	0	5	0%	1.3	1.0
<i>Antocha sp.</i>	2	1	0	0	3	0%	0.8	1.0
<i>Ceratopogoninae</i>	0	0	0	1	1	0%	0.3	0.5
<i>Simulium (Eusimulium)</i>	4	22	1249	142	1417	25%	354.3	599.6
Empididae	0	1	0	0	1	0%	0.3	0.5
Dolichopodidae	0	1	0	0	1	0%	0.3	0.5
EPHEMEROPTERA						3%	46	
<i>Acentrella insignificans</i>	2	7	5	5	19	0%	4.8	2.1
<i>Baetis tricaudatus</i>	10	30	6	40	86	2%	21.5	16.2
<i>Attenella margarita</i>	1	6	0	1	8	0%	2.0	2.7
<i>Serratella tibialis</i>	0	0	1	0	1	0%	0.3	0.5
<i>Ephemerella inermis</i>	0	0	1	0	1	0%	0.3	0.5
<i>Drunella grandis</i>	1	7	1	10	19	0%	4.8	4.5
<i>Epeorus albertae</i>	0	1	0	0	1	0%	0.3	0.5
<i>Nixe sp.</i>	0	5	0	12	17	0%	4.3	5.7
<i>Rhithrogena sp.</i>	3	24	0	1	28	0%	7.0	11.4
<i>Paraleptophlebia sp.</i>	0	1	0	0	1	0%	0.3	0.5
<i>Tricorythodes minutus</i>	2	0	0	0	2	0%	0.5	1.0
LEPIDOPTERA								
<i>Petrophila sp.</i>	3	5	1	1	10	0%	2.5	1.9
PLECOPTERA						1%	19	
<i>Claassenia sabulosa</i>	9	6	3	11	29	1%	7.3	3.5
<i>Hesperoperla pacifica</i>	0	0	0	1	1	0%	0.3	0.5
<i>Isogenoides sp.</i>	1	1	0	2	4	0%	1.0	0.8
<i>Skwala sp.</i>	0	2	0	3	5	0%	1.3	1.5
<i>Pteronarcella badia</i>	14	8	1	12	35	1%	8.8	5.7
<i>Pteronarcys californica</i>	0	1	0	1	2	0%	0.5	0.6

MACROINVERTEBRATE DATA								
BITTERROOT RIVER nr mouth - STATION 19 - 11 AUG 92								
Taxon	sample1	sample2	sample3	sample4	SUM	%RA	MEAN	S. D.
TRICHOPTERA						42%	590	
<i>Arctopsyche grandis</i>	13	15	10	4	42	1%	10.5	4.8
<i>Cheumatopsyche</i> spp.	64	74	86	42	266	5%	66.5	18.6
<i>Hydropsyche occidentalis</i>	322	516	325	437	1600	28%	400.0	94.0
<i>Hydropsyche cockerelli</i>	79	94	86	45	304	5%	76.0	21.6
<i>Hydroptila</i> spp.	0	0	1	0	1	0%	0.3	0.5
<i>Zumatrichia notosa</i>	3	0	6	0	9	0%	2.3	2.9
<i>Brachycentrus occidentalis</i>	5	2	0	2	9	0%	2.3	2.1
<i>Rhyacophila coloradensis</i>	1	0	0	0	1	0%	0.3	0.5
<i>Protophila</i> sp.	4	2	7	1	14	0%	3.5	2.6
<i>Glossosoma</i> sp.	17	13	11	74	115	2%	28.8	30.3
ANNELIDA						1%	9	
Lumbricidae	1	4	3	24	32	1%	8.0	10.7
Naididae	0	2	0	0	2	0%	0.5	1.0
MOLLUSCA						0%	0	
<i>Gyraulus</i> sp.	0	1	0	0	1	0%	0.3	0.5
TOTAL ORGANISMS	855	1375	2164	1291	5685		1421	545
TAXA RICHNESS	34	38	30	34	51		34	3.3
SHAN. DIVERSITY	3.29	3.36	2.37	3.45	3.35		3.12	0.50
BIOTIC INDEX	4.89	4.94	5.05	4.85	4.96		4.93	0.09
EPT RICHNESS	18	20	15	19	27		18	2.2
% R.A. DOMINANT	38%	38%	58%	34%	28%		42%	10.8%
% R.A. FILTERERS	69%	62%	85%	58%	71%		69%	11.9%
METALS TOLERANCE	4.53	4.65	4.98	4.69	4.77		4.71	0.19
Baetidae/Ephemeroptera	0.63	0.46	0.79	0.65	0.57		0.63	0.14
Hydropsychinae/Trichoptera	0.92	0.96	0.93	0.87	0.92		0.92	0.04
EPT / (EPT + CHIR.)	0.71	0.70	0.65	0.67	0.68		0.68	0.03
ID's by D. McGuire								

MACROINVERTEBRATE DATA								
CLARK FORK RIVER @ Harper's Bridge - STATION 20 - 11 AUG 92								
Taxon	sample1	sample2	sample3	sample4	SUM	%RA	MEAN	S. D.
COLEOPTERA						1%	42	
<i>Optioservus spp.</i>	28	27	50	14	119	1%	29.8	14.9
<i>Zaitzevia sp.</i>	12	15	11	11	49	0%	12.3	1.9
DIPTERA						50%	2198	
<i>Thienemannimyia gp.</i>	7	8	10	0	25	0%	6.3	4.3
<i>Potthastia gaeddi gp.</i>	7	11	62	0	80	0%	20.0	28.4
<i>Cardiocladius spp.</i>	55	111	86	182	434	2%	108.5	54.1
<i>Cricotopus spp.</i>	399	431	1622	1435	3887	22%	971.8	647.5
<i>Eukiefferiella spp.</i>	16	27	92	73	208	1%	52.0	36.3
<i>Eukiefferiella devonica gp.</i>	4	0	21	12	37	0%	9.3	9.3
<i>Nanocladius sp.</i>	0	6	0	1	7	0%	1.8	2.9
<i>Synorthocladius sp.</i>	1	5	10	20	36	0%	9.0	8.2
<i>Tvetenia sp.</i>	41	32	239	182	494	3%	123.5	103.2
<i>Polypedilum spp.</i>	214	330	781	421	1746	10%	436.5	244.8
<i>Microtendipes sp</i>	3	0	0	1	4	0%	1.0	1.4
<i>Rheotanytarsus sp.</i>	92	154	323	199	768	4%	192.0	97.7
<i>Tanytarsus sp.</i>	0	0	1	0	1	0%	0.3	0.5
<i>Micropsectra spp.</i>	10	32	11	66	119	1%	29.8	26.2
<i>Hexatoma sp.</i>	2	0	0	1	3	0%	0.8	1.0
<i>Atherix pachypus</i>	30	24	51	64	169	1%	42.3	18.6
<i>Simulium (Eusimulium)</i>	63	17	121	569	770	4%	192.5	254.6
Empididae	0	1	0	0	1	0%	0.3	0.5
<i>Protanyderus sp.</i>	1	0	0	0	1	0%	0.3	0.5
EPHEMEROPTERA						8%	358	
<i>Acentrella insignificans</i>	49	39	213	10	311	2%	77.8	91.7
<i>Baetis tricaudatus</i>	174	141	311	241	867	5%	216.8	75.4
<i>Attenella margarita</i>	14	3	6	0	23	0%	5.8	6.0
<i>Ephemerella inermis</i>	2	0	1	0	3	0%	0.8	1.0
<i>Heptagenia sp.</i>	1	0	11	21	33	0%	8.3	9.8
<i>Rhithrogena sp.</i>	6	22	37	41	106	1%	26.5	15.9
<i>Paraleptophlebia bicornuta</i>	0	0	0	2	2	0%	0.5	1.0
<i>Tricorythodes minutus</i>	10	3	62	11	86	0%	21.5	27.2
HEMIPTERA								
<i>Saldula sp.</i>	1	0	0	0	1	0%	0.3	0.5
LEPIDOPTERA								
<i>Petrophila sp.</i>	10	6	31	6	53	0%	13.3	12.0

MACROINVERTEBRATE DATA								
CLARK FORK RIVER @ Harper's Bridge - STATION 20 - 11 AUG 92								
Taxon	sample1	sample2	sample3	sample4	SUM	%RA	MEAN	S. D.
PLECOPTERA						0%	7	
<i>Claassenia sabulosa</i>	2	7	1	0	10	0%	2.5	3.1
<i>Hesperoperla pacifica</i>	1	0	1	0	2	0%	0.5	0.6
<i>Skwala sp.</i>	1	2	2	0	5	0%	1.3	1.0
<i>Pteronarcella badia</i>	0	1	2	4	7	0%	1.8	1.7
<i>Pteronarcys californica</i>	0	0	2	0	2	0%	0.5	1.0
<i>Isoperla fulva</i>	1	0	0	0	1	0%	0.3	0.5
TRICHOPTERA						39%	1683	
<i>Arctopsyche grandis</i>	29	10	67	60	166	1%	41.5	26.7
<i>Cheumatopsyche spp.</i>	67	150	206	74	497	3%	124.3	66.2
<i>Hydropsyche occidentalis</i>	1013	858	2162	1713	5746	33%	1436.5	610.1
<i>Hydropsyche cockerelli</i>	2	0	11	12	25	0%	6.3	6.1
<i>Zumatrichia notosa</i>	24	31	30	61	146	1%	36.5	16.6
<i>Ceraclea sp.</i>	1	2	10	10	23	0%	5.8	4.9
<i>Oecetis sp.</i>	2	17	41	11	71	0%	17.8	16.7
<i>Psychomyia flavida</i>	2	0	0	10	12	0%	3.0	4.8
<i>Brachycentrus occidentalis</i>	6	1	7	6	20	0%	5.0	2.7
<i>Glossosoma sp.</i>	9	12	2	4	27	0%	6.8	4.6
ANNELIDA						2%	68	
Lumbricidae	1	1	1	0	3	0%	0.8	0.5
Lumbriculidae	0	0	0	1	1	0%	0.3	0.5
Naididae	0	40	42	185	267	2%	66.8	81.2
MOLLUSCA						0%	0	
<i>Gyraulus sp.</i>	0	1	0	0	1	0%	0.3	0.5
TOTAL ORGANISMS	2413	2578	6750	5734	17475		4369	2203
TAXA RICHNESS	42	36	40	36	51		39	3.0
SHAN. DIVERSITY	3.10	3.33	3.21	3.23	3.31		3.22	0.09
BIOTICINDEX	5.21	5.37	5.50	5.54	5.46		5.41	0.15
EPT RICHNESS	21	16	21	17	24		19	2.6
% R.A. DOMINANT	42%	33%	32%	30%	33%		34%	5.3%
% R.A. FILTERERS	53%	46%	43%	46%	46%		47%	4.1%
METALS TOLERANCE	5.46	5.44	5.78	5.96	5.74		5.66	0.25
Baetidae/Ephemeroptera	0.87	0.87	0.82	0.77	0.82		0.83	0.05
Hydropsychinae/Trichoptera	0.94	0.93	0.94	0.92	0.93		0.93	0.01
EPT / (EPT + CHIR.)	0.63	0.53	0.49	0.47	0.51		0.53	0.07
ID's by D. McGuire								

MACROINVERTEBRATE DATA								
CLARK FORK RIVER @ Hnson - STATION 22 - 12 AUG 92								
Taxon	sample1	sample2	sample3	sample4	SUM	%RA	MEAN	S. D.
COLEOPTERA						2%	59	
<i>Optioservus spp.</i>	40	57	47	25	169	1%	42.3	13.5
<i>Zaitzevia sp.</i>	10	20	16	22	68	1%	17.0	5.3
DIPTERA						64%	1871	
<i>Thienemannimyia gp.</i>	0	16	5	31	52	0%	13.0	13.7
<i>Potthastia gaeddi gp.</i>	0	0	10	1	11	0%	2.8	4.9
<i>Potthastia longimanus gp.</i>	0	1	0	0	1	0%	0.3	0.5
<i>Cardiocladius spp.</i>	21	38	100	45	204	2%	51.0	34.2
<i>Corynoneura sp.</i>	0	0	1	0	1	0%	0.3	0.5
<i>Cricotopus spp.</i>	77	373	637	382	1469	13%	367.3	229.0
<i>Eukiefferiella spp.</i>	18	15	22	1	56	0%	14.0	9.1
<i>Eukiefferiella devonica gp.</i>	0	1	23	10	34	0%	8.5	10.7
<i>Paraphaenocladius sp.</i>	1	0	0	2	3	0%	0.8	1.0
<i>Nanocladius sp.</i>	0	0	1	1	2	0%	0.5	0.6
<i>Tvetenia sp.</i>	6	41	75	46	168	1%	42.0	28.3
<i>Polypedilum spp.</i>	85	292	574	453	1404	12%	351.0	211.6
<i>Microtendipes sp.</i>	0	0	10	10	20	0%	5.0	5.8
<i>Phaenopsectra sp.</i>	0	0	0	1	1	0%	0.3	0.5
<i>Cladotanytarsus sp.</i>	0	0	3	0	3	0%	0.8	1.5
<i>Rheotanytarsus sp.</i>	80	154	232	535	1001	9%	250.3	199.7
<i>Micropsectra spp.</i>	3	5	31	54	93	1%	23.3	24.1
<i>Hexatoma sp.</i>	0	1	6	2	9	0%	2.3	2.6
<i>Atherix pachypus</i>	1	2	3	1	7	0%	1.8	1.0
<i>Simulium (Eusimulium)</i>	579	779	912	673	2943	25%	735.8	143.1
Empididae	1	0	0	0	1	0%	0.3	0.5
EPHEMEROPTERA						10%	303	
<i>Accentrella insignificans</i>	16	77	49	94	236	2%	59.0	34.1
<i>Baetis tricaudatus</i>	107	211	233	253	804	7%	201.0	65.0
<i>Attenella margarita</i>	1	1	3	5	10	0%	2.5	1.9
<i>Ephemerella inermis</i>	1	1	2	2	6	0%	1.5	0.6
<i>Drunella grandis</i>	1	1	0	0	2	0%	0.5	0.6
<i>Heptagenia sp.</i>	0	5	5	0	10	0%	2.5	2.9
<i>Rhithrogena sp.</i>	12	21	19	45	97	1%	24.3	14.4
<i>Paraleptophlebia bicornuta</i>	0	0	0	1	1	0%	0.3	0.5
<i>Paraleptophlebia sp.</i>	0	0	0	1	1	0%	0.3	0.5
<i>Tricorythodes minutus</i>	3	5	7	28	43	0%	10.8	11.6
LEPIDOPTERA								
<i>Petrophila sp.</i>	23	39	33	35	130	1%	32.5	6.8
ODONATA								
<i>Ophiogomphus sp.</i>	0	0	0	1	1	0%	0.3	0.5

MACROINVERTEBRATE DATA								
CLARK FORK RIVER @ Huson - STATION 22 - 12 AUG 92								
Taxon	sample1	sample2	sample3	sample4	SUM	%RA	MEAN	S. D.
PLECOPTERA						0%	9	
<i>Claassenia sabulosa</i>	8	3	7	4	22	0%	5.5	2.4
<i>Hesperoperla pacifica</i>	0	1	1	0	2	0%	0.5	0.6
<i>Isogenoides sp.</i>	7	1	0	1	9	0%	2.3	3.2
<i>Skwala sp.</i>	1	0	0	1	2	0%	0.5	0.6
<i>Pteronarcella badia</i>	1	1	0	0	2	0%	0.5	0.6
TRICHOPTERA						21%	624	
<i>Arctopsyche grandis</i>	1	3	2	1	7	0%	1.8	1.0
<i>Cheumatopsyche spp.</i>	52	85	111	54	302	3%	75.5	28.1
<i>Hydropsyche occidentalis</i>	414	609	604	371	1998	17%	499.5	124.8
<i>Hydropsyche cockerelli</i>	7	12	13	2	34	0%	8.5	5.1
<i>Hydroptila spp.</i>	2	1	5	0	8	0%	2.0	2.2
<i>Leucotrichia pictipes</i>	1	0	0	0	1	0%	0.3	0.5
<i>Zumatrichia notosa</i>	3	30	1	1	35	0%	8.8	14.2
<i>Oecetis sp.</i>	2	23	7	15	47	0%	11.8	9.2
<i>Psychomyia flavida</i>	0	1	0	1	2	0%	0.5	0.6
<i>Brachycentrus occidentalis</i>	0	0	1	0	1	0%	0.3	0.5
<i>Protophila sp.</i>	0	5	2	5	12	0%	3.0	2.4
<i>Glossosoma sp.</i>	8	13	4	22	47	0%	11.8	7.8
ANNELIDA						0%	3	
Naididae	0	0	1	10	11	0%	2.8	4.9
MOLLUSCA						0%	1	
<i>Physella sp.</i>	0	0	0	1	1	0%	0.3	0.5
<i>Gyraulus sp.</i>	0	0	1	0	1	0%	0.3	0.5
<i>Fossaria sp.</i>	0	0	1	0	1	0%	0.3	0.5
<i>Valvata humeralis</i>	0	1	0	0	1	0%	0.3	0.5
TOTAL ORGANISMS	1593	2945	3820	3249	11607		2902	945
TAXA RICHNESS	34	39	42	43	57		40	4.0
SHAN. DIVERSITY	2.97	3.33	3.33	3.48	3.41		3.28	0.22
BIOTIC INDEX	5.05	5.23	5.44	5.31	5.30		5.26	0.16
EPT RICHNESS	20	22	19	20	27		20	1.3
% R.A. DOMINANT	36%	26%	24%	21%	25%		27%	6.8%
% R.A. FILTERERS	71%	56%	49%	50%	54%		57%	10.1%
METALS TOLERANCE	4.94	5.18	5.42	4.58	5.06		5.03	0.36
Baetidae/Ephemeroptera	0.87	0.89	0.89	0.81	0.86		0.87	0.04
Hydropsychinae/Trichoptera	0.97	0.90	0.97	0.90	0.94		0.94	0.04
EPT / (EPT + CHIR.)	0.69	0.54	0.38	0.37	0.45		0.50	0.15
ID's by D. McGuire								

MACROINVERTEBRATE DATA								
CLARK FORK RIVER nr ALBERTON - STATION 23 - 12 AUG 92								
Taxon	sample1	sample2	sample3	sample4	SUM	%RA	MEAN	S. D.
COLEOPTERA						1%	26	
<i>Optioservus</i> spp.	26	11	22	33	92	1%	23.0	9.2
<i>Zaitzevia</i> sp.	4	1	7	1	13	0%	3.3	2.9
DIPTERA						42%	838	
<i>Thienemannimyia</i> gp.	2	25	2	6	35	0%	8.8	11.0
<i>Cardiocladius</i> spp.	1	2	0	0	3	0%	0.8	1.0
<i>Corynoneura</i> sp	0	10	0	0	10	0%	2.5	5.0
<i>Cricotopus</i> spp.	28	1335	44	51	1458	18%	364.5	647.1
<i>Eukiefferiella</i> spp.	0	21	1	1	23	0%	5.8	10.2
<i>Eukiefferiella devonica</i> gp.	0	38	2	0	40	1%	10.0	18.7
<i>Synorthocladius</i> sp.	0	6	0	0	6	0%	1.5	3.0
<i>Tvetenia</i> sp.	1	85	8	0	94	1%	23.5	41.2
<i>Polypedilum</i> spp.	72	1098	93	37	1300	16%	325.0	515.9
<i>Microtendipes</i> sp	14	5	5	21	45	1%	11.3	7.8
<i>Phaenopsectra</i> sp	3	0	1	0	4	0%	1.0	1.4
<i>Xenochironomus</i> sp.	9	3	0	1	13	0%	3.3	4.0
<i>Rheotanytarsus</i> sp.	23	72	29	28	152	2%	38.0	22.8
<i>Tanytarsus</i> sp.	0	0	1	0	1	0%	0.3	0.5
<i>Micropsectra</i> spp.	14	21	7	6	48	1%	12.0	7.0
<i>Atherix pachypus</i>	0	0	1	0	1	0%	0.3	0.5
<i>Simulium</i> (<i>Eusimulium</i>)	21	73	7	17	118	1%	29.5	29.6
EPHEMEROPTERA						8%	163	
<i>Acentrella insignificans</i>	15	10	5	2	32	0%	8.0	5.7
<i>Baetis tricaudatus</i>	44	166	37	21	268	3%	67.0	66.7
<i>Attenella margarita</i>	3	2	4	0	9	0%	2.3	1.7
<i>Ephemerella inermis</i>	1	2	0	2	5	0%	1.3	1.0
<i>Drunella grandis</i>	1	0	0	0	1	0%	0.3	0.5
<i>Epeorus albertae</i>	8	2	6	4	20	0%	5.0	2.6
<i>Heptagenia</i> sp.	68	52	43	97	260	3%	65.0	23.7
<i>Rhithrogena</i> sp.	0	1	0	0	1	0%	0.3	0.5
<i>Paraleptophlebia bicornuta</i>	0	1	0	1	2	0%	0.5	0.6
<i>Paraleptophlebia</i> sp.	0	5	0	0	5	0%	1.3	2.5
<i>Tricorythodes minutus</i>	13	11	11	14	49	1%	12.3	1.5
LEPIDOPTERA								
<i>Petrophila</i> sp.	51	46	46	44	187	2%	46.8	3.0
ODONATA								
<i>Ophiogomphus</i> sp.	1	0	0	0	1	0%	0.3	0.5
PLECOPTERA						1%	10	
<i>Claassenia sabulosa</i>	3	19	2	4	28	0%	7.0	8.0
<i>Hesperoperla pacifica</i>	0	1	0	1	2	0%	0.5	0.6
<i>Isogenoides</i> sp.	3	3	1	3	10	0%	2.5	1.0
<i>Skwala</i> sp.	0	0	1	0	1	0%	0.3	0.5

MACROINVERTEBRATE DATA								
CLARK FORK RIVER nr ALBERTON - STATION 23 - 12 AUG 92								
Taxon	sample1	sample2	sample3	sample4	SUM	%RA	MEAN	S. D.
TRICHOPTERA						44%	883	
<i>Arctopsyche grandis</i>	0	1	1	0	2	0%	0.5	0.6
<i>Cheumatopsyche</i> spp.	144	264	162	142	712	9%	178.0	58.0
<i>Hydropsyche occidentalis</i>	372	1224	371	177	2144	27%	536.0	467.7
<i>Hydropsyche cockerelli</i>	75	159	69	44	347	4%	86.8	50.0
<i>Hydroptila</i> spp.	2	1	3	1	7	0%	1.8	1.0
<i>Leucotrichia pictipes</i>	0	5	2	0	7	0%	1.8	2.4
<i>Zumatrichia notosa</i>	8	100	27	4	139	2%	34.8	44.6
<i>Ceraclea</i> sp.	9	6	0	1	16	0%	4.0	4.2
<i>Oecetis</i> sp.	11	14	16	3	44	1%	11.0	5.7
<i>Psychomyia flavida</i>	10	24	5	5	44	1%	11.0	9.0
<i>Brachycentrus occidentalis</i>	11	16	4	3	34	0%	8.5	6.1
<i>Protoptila</i> sp.	13	1	21	0	35	0%	8.8	10.1
ANNELIDA						1%	17	
Lumbricidae	0	2	1	0	3	0%	0.8	1.0
Naididae	1	15	0	0	16	0%	4.0	7.3
Tubificidae	1	21	6	18	46	1%	11.5	9.5
Erpobdellidae	2	0	0	0	2	0%	0.5	1.0
MOLLUSCA						1%	11	
<i>Physella</i> sp.	1	1	0	0	2	0%	0.5	0.6
<i>Ferrissia</i> sp.	26	0	6	6	38	0%	9.5	11.4
<i>Gyraulus</i> sp.	0	0	1	1	2	0%	0.5	0.6
<i>Sphaeriidae</i>	1	0	0	0	1	0%	0.3	0.5
TOTAL ORGANISMS	1116	4981	1081	800	7978		1995	1996
TAXA RICHNESS	41	46	40	34	56		40	4.9
SHAN. DIVERSITY	3.72	3.08	3.55	3.74	3.52		3.52	0.31
BIOTIC INDEX	4.83	5.67	4.93	5.05	5.39		5.12	0.38
EPT RICHNESS	20	25	20	19	27		21	2.7
% R.A. DOMINANT	33%	27%	34%	22%	27%		29%	5.7%
% R.A. FILTERERS	58%	36%	59%	51%	44%		51%	10.6%
METALS TOLERANCE	4.10	5.79	4.33	4.26	5.20		4.62	0.79
Baetidae/Ephemeroptera	0.39	0.70	0.40	0.16	0.46		0.41	0.22
Hydropsychinae/Trichoptera	0.90	0.91	0.88	0.96	0.91		0.91	0.03
EPT / (EPT + CHIR.)	0.83	0.43	0.80	0.78	0.57		0.71	0.19
ID's by D. McGuire								

MACROINVERTEBRATE DATA								
CLARK FORK RIVER at Superior - STATION 24 - 12 AUG 92								
Taxon	sample1	sample2	sample3	sample4	SUM	%RA	MEAN	S. D.
COLEOPTERA						4%	40	
<i>Optioservus spp.</i>	13	29	27	7	76	2%	19.0	10.7
<i>Zaitzevia sp.</i>	14	43	24	2	83	2%	20.8	17.3
DIPTERA						30%	283	
<i>Thienemannimyia gp.</i>	4	7	0	16	27	1%	6.8	6.8
<i>Cardiocladius spp.</i>	0	0	0	1	1	0%	0.3	0.5
<i>Cricotopus spp.</i>	29	42	14	426	511	13%	127.8	199.2
<i>Eukiefferiella spp.</i>	0	5	1	2	8	0%	2.0	2.2
<i>Nanocladius sp.</i>	1	0	0	3	4	0%	1.0	1.4
<i>Synorthocladius sp.</i>	0	0	2	11	13	0%	3.3	5.3
<i>Tvetenia sp.</i>	9	25	10	11	55	1%	13.8	7.5
<i>Polypedilum spp.</i>	18	64	19	92	193	5%	48.3	36.2
<i>Microtendipes sp</i>	18	66	10	20	114	3%	28.5	25.4
<i>Phaenopsectra sp</i>	1	0	0	1	2	0%	0.5	0.6
<i>Xenochironomus sp.</i>	2	0	0	0	2	0%	0.5	1.0
<i>Rheotanytarsus sp.</i>	3	6	5	5	19	0%	4.8	1.3
<i>Tanytarsus sp.</i>	0	0	2	0	2	0%	0.5	1.0
<i>Microsectra spp.</i>	12	78	71	17	178	5%	44.5	34.8
<i>Simulium (Eusimulium)</i>	0	0	1	1	2	0%	0.5	0.6
EPHEMEROPTERA						8%	78	
<i>Ameletus sp.</i>	0	0	0	1	1	0%	0.3	0.5
<i>Acentrella insignificans</i>	6	1	7	8	22	1%	5.5	3.1
<i>Baetis tricaudatus</i>	9	2	3	16	30	1%	7.5	6.5
<i>Attenella margarita</i>	0	1	0	4	5	0%	1.3	1.9
<i>Serratella tibialis</i>	3	1	3	7	14	0%	3.5	2.5
<i>Ephemerella inermis</i>	2	0	0	10	12	0%	3.0	4.8
<i>Drunella grandis</i>	3	5	8	8	24	1%	6.0	2.4
<i>Timpango hecuba</i>	1	0	0	0	1	0%	0.3	0.5
<i>Epeorus albertae</i>	5	0	2	5	12	0%	3.0	2.4
<i>Heptagenia sp.</i>	16	85	4	20	125	3%	31.3	36.5
<i>Nixe sp.</i>	0	0	2	7	9	0%	2.3	3.3
<i>Rhithrogena sp.</i>	5	6	10	9	30	1%	7.5	2.4
<i>Paraleptophlebia bicornuta</i>	1	1	0	2	4	0%	1.0	0.8
<i>Paraleptophlebia sp.</i>	1	0	0	4	5	0%	1.3	1.9
<i>Tricorythodes minutus</i>	3	6	2	8	19	0%	4.8	2.8
LEPIDOPTERA								
<i>Petrophila sp.</i>	28	19	18	49	114	3%	28.5	14.4
PLECOPTERA						1%	7	
<i>Claassenia sabulosa</i>	8	7	3	3	21	1%	5.3	2.6
<i>Hesperoperla pacifica</i>	1	0	0	0	1	0%	0.3	0.5
<i>Isogenoides sp.</i>	0	1	0	0	1	0%	0.3	0.5
<i>Skwala sp.</i>	1	1	0	1	3	0%	0.8	0.5
<i>Isoperla fulva</i>	0	1	0	1	2	0%	0.5	0.6

MACROINVERTEBRATE DATA								
CLARK FORK RIVER at Superior - STATION 24 - 12 AUG 92								
Taxon	sample1	sample2	sample3	sample4	SUM	%RA	MEAN	S. D.
TRICHOPTERA						50%	481	
<i>Arctopsyche grandis</i>	8	1	0	5	14	0%	3.5	3.7
<i>Cheumatopsyche</i> spp.	227	368	203	175	973	25%	243.3	85.8
<i>Hydropsyche occidentalis</i>	104	134	100	130	468	12%	117.0	17.5
<i>Hydropsyche cockerelli</i>	66	97	62	53	278	7%	69.5	19.1
<i>Hydropsyche oslari</i>	1	0	0	0	1	0%	0.3	0.5
<i>Dicosmoecus</i> sp.	1	2	2	7	12	0%	3.0	2.7
<i>Hydroptila</i> spp.	0	2	0	12	14	0%	3.5	5.7
<i>Leucotrichia pictipes</i>	1	1	3	7	12	0%	3.0	2.8
<i>Zumatrichia notosa</i>	4	2	2	18	26	1%	6.5	7.7
<i>Ceraclea</i> sp.	0	2	10	9	21	1%	5.3	5.0
<i>Oecetis</i> sp.	2	3	2	3	10	0%	2.5	0.6
<i>Psychomyia flavida</i>	12	37	6	20	75	2%	18.8	13.5
<i>Brachycentrus occidentalis</i>	5	1	0	0	6	0%	1.5	2.4
<i>Protophila</i> sp.	1	0	2	1	4	0%	1.0	0.8
<i>Glossosoma</i> sp.	1	6	2	0	9	0%	2.3	2.6
ANNELIDA						0%	3	
Lumbriculidae	2	3	3	3	11	0%	2.8	0.5
Naididae	0	1	0	0	1	0%	0.3	0.5
MOLLUSCA						2%	24	
<i>Physella</i> sp.	9	15	0	14	38	1%	9.5	6.9
<i>Ferrissia</i> sp.	7	15	1	31	54	1%	13.5	13.0
<i>Sphaeriidae</i>	0	0	0	3	3	0%	0.8	1.5
OTHER								0.0
Turbellaria	1	21	23	1	46	1%	11.5	12.2
TOTAL ORGANISMS	669	1213	669	1270	3821		955	331
TAXA RICHNESS	45	42	37	50	59		44	5.4
SHAN. DIVERSITY	3.71	3.74	3.66	3.76	4.01		3.72	0.05
BIOTIC INDEX	4.71	4.78	4.54	5.45	4.95		4.87	0.40
EPT RICHNESS	28	26	21	29	35		26	3.6
% R.A. DOMINANT	34%	30%	30%	34%	25%		32%	2.0%
% R.A. FILTERERS	62%	50%	55%	29%	46%		49%	14.2%
METALS TOLERANCE	4.34	4.06	4.04	5.75	4.67		4.55	0.82
Baetidae/Ephemeroptera	0.27	0.03	0.24	0.22	0.17		0.19	0.11
Hydropsychinae/Trichoptera	0.92	0.92	0.93	0.83	0.90		0.90	0.05
EPT / (EPT + CHIR.)	0.84	0.73	0.77	0.48	0.67		0.70	0.16
ID's by D. McGuire								

MACROINVERTEBRATE DATA								
CLARK FORK RIVER above Flathead River - STATION 25 - 13 AUG 92								
Taxon	sample1	sample2	sample3	sample4	SUM	%RA	MEAN	S. D.
TRICHOPTERA						48%	656	
<i>Arctopsyche grandis</i>	4	14	3	2	23	0%	5.8	5.6
<i>Cheumatopsyche</i> spp.	223	177	354	428	1182	22%	295.5	115.9
<i>Hydropsyche occidentalis</i>	212	76	184	406	878	16%	219.5	137.5
<i>Hydropsyche cockerelli</i>	66	75	52	125	318	6%	79.5	31.8
<i>Hydroptila</i> spp.	1	1	16	7	25	0%	6.3	7.1
<i>Leucotrichia pictipes</i>	0	2	0	5	7	0%	1.8	2.4
<i>Zumatrichia notosa</i>	12	21	27	52	112	2%	28.0	17.1
<i>Ceraclea</i> sp.	10	5	11	17	43	1%	10.8	4.9
<i>Psychomyia flavida</i>	5	2	0	25	32	1%	8.0	11.5
<i>Brachycentrus occidentalis</i>	0	0	1	0	1	0%	0.3	0.5
<i>Protophila</i> sp.	0	1	0	0	1	0%	0.3	0.5
<i>Glossosoma</i> sp.	0	0	1	0	1	0%	0.3	0.5
ANNELIDA						0%	7	
Lumbricidae	1	0	16	8	25	0%	6.3	7.4
Tubificidae	1	0	0	0	1	0%	0.3	0.5
OTHER								0.0
Turbellaria	1	1	10	24	36	1%	9.0	10.9
TOTAL ORGANISMS	1058	615	1241	2505	5419		1355	811
TAXA RICHNESS	44	34	39	44	52		40	4.8
SHAN. DIVERSITY	3.72	3.68	3.66	3.89	3.91		3.74	0.10
BIOTIC INDEX	5.00	4.71	5.11	5.19	5.08		5.00	0.21
EPT RICHNESS	21	18	20	22	28		20	1.7
% R.A. DOMINANT	21%	29%	29%	17%	22%		24%	5.7%
% R.A. FILTERERS	51%	60%	57%	48%	52%		54%	5.8%
METALS TOLERANCE	4.59	4.07	4.90	5.31	4.94		4.72	0.52
Baetidae/Ephemeroptera	0.09	0.16	0.27	0.36	0.24		0.22	0.12
Hydropsychinae/Trichoptera	0.94	0.88	0.91	0.90	0.91		0.91	0.03
EPT / (EPT + CHIR.)	0.61	0.75	0.63	0.55	0.61		0.64	0.08
ID's by D. McGuire								

MACROINVERTEBRATE DATA								
CLARK FORK RIVER above Flathead River - STATION 25 - 13 AUG 92								
Taxon	sample1	sample2	sample3	sample4	SUM	%RA	MEAN	S. D.
COLEOPTERA						2%	27	
<i>Optioservus spp.</i>	8	2	16	36	62	1%	15.5	14.8
<i>Zaitzevia sp.</i>	4	0	7	34	45	1%	11.3	15.4
DIPTERA						40%	546	
<i>Thienemannimyia gp.</i>	4	1	0	11	16	0%	4.0	5.0
<i>Cardiocladius spp.</i>	21	5	22	71	119	2%	29.8	28.6
<i>Cricotopus spp.</i>	112	38	176	433	759	14%	189.8	171.7
<i>Eukiefferiella spp.</i>	2	1	1	24	28	1%	7.0	11.3
<i>Eukiefferiella devonica gp.</i>	2	2	1	21	26	0%	6.5	9.7
<i>Nanocladius sp.</i>	2	0	0	2	4	0%	1.0	1.2
<i>Synorthocladius sp.</i>	3	0	5	4	12	0%	3.0	2.2
<i>Tvetenia sp.</i>	79	28	15	188	310	6%	77.5	78.7
<i>Polypedilum spp.</i>	89	26	73	136	324	6%	81.0	45.4
<i>Microtendipes sp</i>	1	3	8	0	12	0%	3.0	3.6
<i>Xenochironomus sp.</i>	14	11	6	2	33	1%	8.3	5.3
<i>Paratanytarsus sp.</i>	0	1	1	1	3	0%	0.8	0.5
<i>Rheotanytarsus sp.</i>	33	28	76	65	202	4%	50.5	23.6
<i>Tanytarsus sp.</i>	3	0	8	10	21	0%	5.3	4.6
<i>Micropsectra spp.</i>	31	7	30	29	97	2%	24.3	11.5
<i>Antocha sp.</i>	1	0	0	1	2	0%	0.5	0.6
<i>Simulium (Eusimulium)</i>	2	2	42	169	215	4%	53.8	79.1
EPHEMEROPTERA						6%	88	
<i>Ameletus sp.</i>	1	0	0	0	1	0%	0.3	0.5
<i>Acentrella insignificans</i>	2	8	2	12	24	0%	6.0	4.9
<i>Baetis tricaudatus</i>	6	2	14	39	61	1%	15.3	16.6
<i>Serratella tibialis</i>	7	2	0	3	12	0%	3.0	2.9
<i>Ephemerella inermis</i>	2	0	1	10	13	0%	3.3	4.6
<i>Drunella grandis</i>	2	0	1	6	9	0%	2.3	2.6
<i>Epeorus albertae</i>	7	7	1	1	16	0%	4.0	3.5
<i>Heptagenia sp.</i>	58	40	19	44	161	3%	40.3	16.1
<i>Rhithrogena sp.</i>	1	2	19	9	31	1%	7.8	8.3
<i>Paraleptophlebia bicornuta</i>	1	0	0	0	1	0%	0.3	0.5
<i>Paraleptophlebia sp.</i>	5	0	2	16	23	0%	5.8	7.1
LEPIDOPTERA								
<i>Petrophila sp.</i>	12	11	8	19	50	1%	12.5	4.7
ODONATA								
<i>Ophiogomphus sp.</i>	1	0	0	1	2	0%	0.5	0.6
PLECOPTERA						1%	10	
<i>Claassenia sabulosa</i>	2	6	8	4	20	0%	5.0	2.6
<i>Isogenoides sp.</i>	4	7	3	3	17	0%	4.3	1.9
<i>Skwala parallela</i>	0	0	1	0	1	0%	0.3	0.5
<i>Pteronarcys californica</i>	0	0	0	1	1	0%	0.3	0.5
<i>Isoperla fulva</i>	0	0	0	1	1	0%	0.3	0.5

MACROINVERTEBRATE DATA								
CLARK FORK RIVER above Thompson Falls R. - STATION 27 -13 AUG 92								
Taxon	sample1	sample2	sample3	sample4	SUM	%RA	MEAN	S. D.
COLEOPTERA						4%	25	
<i>Optioservus</i> spp.	30	2	7	4	43	2%	10.8	13.0
<i>Zaitzevia</i> sp.	6	24	18	8	56	2%	14.0	8.5
DIPTERA						21%	132	
<i>Thienemannimyia</i> gp.	3	0	0	0	3	0%	0.8	1.5
<i>Corynoneura</i> sp	1	0	0	0	1	0%	0.3	0.5
<i>Cricotopus</i> spp.	2	0	29	0	31	1%	7.8	14.2
<i>Eukiefferiella devonica</i> gp.	3	0	0	0	3	0%	0.8	1.5
<i>Thienemanniella</i> sp.	0	0	0	2	2	0%	0.5	1.0
<i>Nanocladius</i> sp.	0	0	2	0	2	0%	0.5	1.0
<i>Tvetenia</i> sp.	3	7	37	1	48	2%	12.0	16.9
<i>Polypedilum</i> spp.	7	0	4	0	11	0%	2.8	3.4
<i>Microtendipes</i> sp	5	0	0	1	6	0%	1.5	2.4
<i>Rheotanytarsus</i> sp.	4	150	185	58	397	16%	99.3	83.1
<i>Cladotanytarsus</i> sp.	0	0	1	1	2	0%	0.5	0.6
<i>Micropsectra</i> spp.	0	0	0	1	1	0%	0.3	0.5
<i>Simulium</i> (<i>Eusimulium</i>)	2	5	11	1	19	1%	4.8	4.5
EPHEMEROPTERA						6%	39	
<i>Acentrella insignificans</i>	1	1	0	0	2	0%	0.5	0.6
<i>Baetis tricaudatus</i>	1	0	0	0	1	0%	0.3	0.5
<i>Drunella grandis</i>	0	0	1	0	1	0%	0.3	0.5
<i>Heptagenia</i> sp.	0	1	0	0	1	0%	0.3	0.5
<i>Stenonema</i> sp.	11	71	65	3	150	6%	37.5	35.5
LEPIDOPTERA								
<i>Petrophila</i> sp.	3	3	34	23	63	3%	15.8	15.4
ODONATA								
<i>Ophiogomphus</i> sp.	0	1	0	1	2	0%	0.5	0.6
TRICHOPTERA						61%	383	
<i>Cheumatopsyche</i> spp.	99	326	552	203	1180	47%	295.0	194.8
<i>Hydropsyche occidentalis</i>	32	24	48	5	109	4%	27.3	17.9
<i>Hydropsyche cockerelli</i>	34	69	92	10	205	8%	51.3	36.4
<i>Hydroptila</i> spp.	0	0	3	0	3	0%	0.8	1.5
<i>Zumatrichia notosa</i>	3	1	0	1	5	0%	1.3	1.3
<i>Ceraclea</i> sp.	0	5	3	2	10	0%	2.5	2.1
<i>Psychomyia flavida</i>	0	0	3	0	3	0%	0.8	1.5
<i>Brachycentrus occidentalis</i>	0	0	1	0	1	0%	0.3	0.5
<i>Protophila</i> sp.	0	2	0	0	2	0%	0.5	1.0
<i>Glossosoma</i> sp.	0	7	2	3	12	0%	3.0	2.9

MACROINVERTEBRATE DATA								
CLARK FORK RIVER above Thompson Falls R. - STATION 27 -13 AUG 92								
Taxon	sample1	sample2	sample3	sample4	SUM	%RA	MEAN	S. D.
ANNELIDA						0%	3	
Lumbriculidae	0	1	1	8	10	0%	2.5	3.7
MOLLUSCA						5%	29	
<i>Physella sp.</i>	0	2	0	20	22	1%	5.5	9.7
<i>Ferrissia sp.</i>	0	0	1	0	1	0%	0.3	0.5
<i>Gyraulus sp.</i>	4	12	0	4	20	1%	5.0	5.0
<i>Fossaria sp.</i>	6	18	4	40	68	3%	17.0	16.5
<i>Fisherola sp.</i>	0	2	2	0	4	0%	1.0	1.2
OTHER								0.0
Turbellaria	0	0	1	6	7	0%	1.8	2.9
TOTAL ORGANISMS	260	734	1107	406	2507		627	377
TAXA RICHNESS	21	22	25	23	39		23	1.7
SHAN. DIVERSITY	3.10	2.60	2.56	2.66	2.86		2.73	0.25
BIOTICINDEX	4.96	4.98	5.04	5.29	5.05		5.07	0.15
EPT RICHNESS	7	10	10	7	15		9	1.7
% R.A. DOMINANT	38%	44%	50%	50%	47%		46%	5.6%
% R.A. FILTERERS	66%	78%	80%	68%	76%		73%	7.2%
METALS TOLERANCE	4.42	3.47	3.98	3.71	3.83		3.89	0.41
Baetidae/Ephemeroptera	0.15	0.01	0.00	0.00	0.02		0.04	0.07
Hydropsychinae/Trichoptera	0.98	0.97	0.98	0.97	0.98		0.98	0.01
EPT / (EPT + CHIR.)	0.87	0.76	0.75	0.78	0.77		0.79	0.05
ID's by D. McGuire								

APPENDIX D

**Metric values and bioassessment scores for Clark Fork
River monitoring stations, 1986-1992**

**Appendix D.1. Mean metric values and bioassessment scores for Clark Fork River
Station 00 - August, 1987-92 (four Hess samples per year).**

	1986	1987	1988	1989	1990	1991	1992	Mean
Metric values								
Taxa richness		5	6	6	7	9	10	7
Shannon diversity		1.6	2.3	0.9	1.4	1.8	1.4	1.5
EPT/EPTC		0.03	0.03	0.00	0.00	0.01	0.01	0.01
Hydropsychinae/Trichoptera		1.00	0.75	1.00	1.00	1.00	1.00	0.96
Baetidae/Ephemeroptera		1.00	1.00	1.00	1.00	0.00	1.00	0.83
Biotic index		4.9	5.1	6.6	5.7	4.9	6.3	5.6
% Filterer		0	2	1	0	0	0	1
Density		26	46	175	362	344	167	187
EPT richness		0	1	0	1	1	1	1
Metals Tolerance index		9.3	9.2	9.7	9.4	9.2	9.3	9.4
Metric scores								
Taxa richness		0	0	0	0	0	0	0
Shannon diversity		1	3	0	0	2	0	1
EPT/EPTC		0	0	0	0	0	0	0
Hydropsychinae/Trichoptera		0	6	0	0	0	0	1
Baetidae/Ephemeroptera		0	0	0	0	6	0	1
Biotic index		4	4	1	3	4	2	3
% Filterer		6	6	6	6	6	6	6
Density (high)		*	*	*	*	*	*	*
Density (low)		0	0	2	4	3	2	2
EPT richness		0	0	0	0	0	0	0
Metals Tolerance index		0	0	0	0	0	0	0
Total		11	19	9	13	21	10	14
Organic subset		10	10	7	9	10	8	9
Metals subset		0	0	2	4	3	2	2
Bioassessment								
Overall		18%	32%	15%	22%	35%	17%	23%
Organic subset		83%	83%	58%	75%	83%	67%	75%
Metals subset		0%	0%	11%	22%	17%	11%	10%

* not calculated if density is < 550

**Appendix D.2. Mean metric values and bioassessment scores for Clark Fork River
Station 01 - August, 1986-92 (four Hess samples per year).**

	1986	1987	1988	1989	1990	1991	1992	Mean
Metric values								
Taxa richness	7	6	11	5	7	11	11	8
Shannon diversity	1.1	1.7	1.5	1.0	1.2	2.1	2.0	1.5
EPT/EPTC	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00
Hydropsychinae/Trichoptera	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Baetidae/Ephemeroptera	0.75	1.00	1.00	1.00	1.00	1.00	1.00	0.96
Biotic index	6.9	6.3	6.0	6.9	6.8	6.5	7.4	6.7
% Filterer	55	3	59	73	69	28	51	48
Density	628	118	1450	361	1763	473	315	730
EPT richness	1	1	1	0	0	0	0	0
Metals Tolerance index	8.3	9.3	7.8	7.7	7.8	8.9	7.8	8.2
Metric scores								
Taxa richness	0	0	0	0	0	0	0	0
Shannon diversity	0	1	1	0	0	2	2	1
EPT/EPTC	0	0	0	0	0	0	0	0
Hydropsychinae/Trichoptera	0	0	0	0	0	0	0	0
Baetidae/Ephemeroptera	6	0	0	0	0	0	0	1
Biotic index	1	2	2	1	1	1	0	1
% Filterer	5	6	4	1	2	6	5	4
Density (high)	6	*	6	*	6	*	*	6
Density (low)	6	1	6	4	6	5	3	4
EPT richness	0	0	0	0	0	0	0	0
Metals Tolerance index	1	0	2	2	2	1	2	1
Total	25	10	21	8	17	15	12	19
Organic subset	12	8	12	2	9	7	5	11
Metals subset	7	1	8	6	8	6	5	6
Bioassessment								
Overall	38%	15%	32%	12%	26%	23%	18%	23%
Organic subset	67%	67%	67%	17%	50%	58%	42%	52%
Metals subset	39%	6%	44%	33%	44%	33%	28%	33%

**Appendix D.3. Mean metric values and bioassessment scores for Clark Fork River
Station 02 - August, 1986-92 (four Hess samples per year).**

	1986	1987	1988	1989	1990	1991	1992	Mean
Metric values								
Taxa richness	7	8	12	7	6	10	8	8
Shannon diversity	1.6	1.8	1.7	2.0	1.7	2.2	1.9	1.8
EPT/EPTC	0.07	0.09	0.68	0.29	0.31	0.54	0.11	0.30
Hydropsychinae/Trichoptera	1.00	0.96	1.00	1.00	0.97	0.97	1.00	0.99
Baetidae/Ephemeroptera	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Biotic index	4.9	4.8	4.7	4.2	4.5	4.8	4.4	4.6
% Filterer	6	8	66	28	31	51	13	29
Density	46	264	292	251	175	115	113	179
EPT richness	1	2	3	2	2	2	2	2
Metals Tolerance index	8.5	8.7	6.7	8.2	8.1	7.4	8.7	8.0
Metric scores								
Taxa richness	0	0	0	0	0	0	0	0
Shannon diversity	1	2	1	2	1	3	2	2
EPT/EPTC	1	1	6	3	3	5	1	3
Hydropsychinae/Trichoptera	0	2	0	0	1	1	0	1
Baetidae/Ephemeroptera	0	0	0	0	0	0	0	0
Biotic index	4	4	4	5	5	4	5	4
% Filterer	6	6	2	6	6	5	6	5
Density (high)	*	*	*	*	*	*	*	*
Density (low)	0	3	3	3	2	1	1	2
EPT richness	0	1	1	1	1	1	1	1
Metals Tolerance index	1	1	3	1	1	2	1	1
Total	13	20	20	21	20	22	17	19
Organic subset	10	10	6	11	11	9	11	10
Metals subset	1	5	7	5	4	4	3	4
Bioassessment								
Overall	22%	33%	33%	35%	33%	37%	28%	32%
Organic subset	83%	83%	50%	92%	92%	75%	92%	81%
Metals subset	6%	28%	39%	28%	22%	22%	17%	23%

* not calculated if density is < 550

**Appendix D.4. Mean metric values and bioassessment scores for Clark Fork River
Station 03 - August, 1986-92 (four Hess samples per year).**

	1986	1987	1988	1989	1990	1991	1992	Mean
Metric values								
Taxa richness	9	11	14	11	8	11	16	11
Shannon diversity	2.1	2.3	2.1	2.6	2.2	2.3	2.9	2.4
EPT/EPTC	0.63	0.27	0.74	0.44	0.52	0.51	0.75	0.55
Hydropsychinae/Trichoptera	0.98	0.87	0.98	0.86	0.89	0.89	0.98	0.92
Baetidae/Ephemeroptera	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Biotic index	4.0	4.9	5.4	3.8	4.3	4.7	4.6	4.5
% Filterer	53	21	73	39	51	51	71	51
Density	82	120	378	189	147	220	396	219
EPT richness	3	3	5	5	3	4	7	4
Metals Tolerance index	7.0	8.0	6.7	7.5	7.4	7.5	6.0	7.1
Metric scores								
Taxa richness	0	0	0	0	0	0	1	0
Shannon diversity	2	3	2	4	3	3	4	3
EPT/EPTC	6	3	6	4	5	5	6	5
Hydropsychinae/Trichoptera	1	5	1	5	4	4	1	3
Baetidae/Ephemeroptera	0	0	0	0	0	0	0	0
Biotic index	5	4	3	6	5	4	4	4
% Filterer	5	6	1	6	5	5	1	4
Density (high)	*	*	*	*	*	*	*	*
Density (low)	1	1	4	2	1	2	4	2
EPT richness	1	1	1	1	1	1	2	1
Metals Tolerance index	2	1	3	2	2	2	3	2
Total	23	24	21	30	26	26	26	25
Organic subset	10	10	4	12	10	9	5	9
Metals subset	4	3	8	5	4	5	9	5
Bioassessment								
Overall	38%	40%	35%	50%	43%	43%	43%	42%
Organic subset	83%	83%	33%	100%	83%	75%	42%	71%
Metals subset	22%	17%	44%	28%	22%	28%	50%	30%

* not calculated if density is < 550

**Appendix D.5 Mean metric values and bioassessment scores for Clark Fork River
Station 04 - August, 1986-91 (four Hess samples per year).**

	1986	1987	1988	1989	1990	1991	Mean
Metric values							
Taxa richness	16	16	18	16	13	16	16
Shannon diversity	2.4	1.6	2.5	2.7	2.1	1.9	2.2
EPT/EPTC	0.96	0.98	0.97	0.92	0.99	1.00	0.97
Hydropsychinae/Trichoptera	1.00	1.00	1.00	0.97	1.00	1.00	1.00
Baetidae/Ephemeroptera	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Biotic index	6.3	5.1	5.8	5.9	5.0	5.1	5.5
% Filterer	66	94	75	79	93	90	83
Density	2558	1648	2563	2574	3223	1952	2420
EPT richness	4	5	4	6	6	5	5
Metals Tolerance index	5.1	5.4	5.1	5.8	5.4	5.8	5.4
Metric scores							
Taxa richness	1	1	1	1	0	1	1
Shannon diversity	3	1	3	4	2	2	3
EPT/EPTC	6	6	6	6	6	6	6
Hydropsychinae/Trichoptera	0	0	0	1	0	0	0
Baetidae/Ephemeroptera	0	0	0	0	0	0	0
Biotic index	2	4	2	2	4	4	3
% Filterer	2	0	1	0	0	0	1
Density (high)	5	6	5	5	3	6	5
Density (low)	6	6	6	6	6	6	6
EPT richness	1	1	1	2	2	1	1
Metals Tolerance index	4	4	4	4	4	4	4
Total	30	29	29	31	27	30	29
Organic subset	9	10	8	7	7	10	9
Metals subset	11	11	11	12	12	11	11
Bioassessment							
Overall	45%	44%	44%	47%	41%	45%	44%
Organic subset	50%	56%	44%	39%	39%	56%	47%
Metals subset	61%	61%	61%	67%	67%	61%	63%

**Appendix D.6. Mean metric values and bioassessment scores for Clark Fork River
Station 05 - August, 1986-91 (four Hess samples per year).**

	1986	1987	1988	1989	1991	Mean
Metric values						
Taxa richness	25	21	22	23	17	22
Shannon diversity	3.2	2.9	3.0	2.9	2.4	2.9
EPT/EPTC	0.86	0.97	0.91	0.86	0.80	0.88
Hydropsychinae/Trichoptera	0.96	0.88	0.85	0.92	0.98	0.92
Baetidae/Ephemeroptera	0.98	1.00	1.00	0.96	0.97	0.98
Biotic index	4.6	4.7	4.3	5.2	5.6	4.9
% Filterer	63	74	63	72	67	68
Density	357	822	869	1376	408	766
EPT richness	11	10	8	10	7	9
Metals Tolerance index	5.2	5.1	5.3	5.6	6.8	5.6
Metric scores						
Taxa richness	3	2	2	2	1	2
Shannon diversity	5	4	5	4	3	4
EPT/EPTC	6	6	6	6	6	6
Hydropsychinae/Trichoptera	2	4	6	3	1	3
Baetidae/Ephemeroptera	1	0	0	2	1	1
Biotic index	4	4	5	3	3	4
% Filterer	3	1	3	1	2	2
Density (high)	*	6	6	6	*	6
Density (low)	4	6	6	6	4	5
EPT richness	3	3	2	3	2	3
Metals Tolerance index	4	4	4	4	3	4
Total	35	40	45	40	26	40
Organic subset	7	11	14	10	5	12
Metals subset	11	13	12	13	9	12
Bioassessment						
Biointegrity	58%	61%	68%	61%	43%	58%
Organic subset	58%	61%	78%	56%	42%	59%
Metals subset	61%	72%	67%	72%	50%	64%

* not calculated if density is < 550

**Appendix D.7. Mean metric values and bioassessment scores for Clark Fork River
Station 06 - August, 1986-91 (four Hess samples per year).**

	1986	1987	1988	1989	1990	1991	Mean
Metric values							
Taxa richness	17	24	26	27	29	30	26
Shannon diversity	3.3	3.6	3.8	3.5	3.6	3.5	3.6
EPT/EPTC	0.91	0.66	0.78	0.75	0.60	0.85	0.76
Hydropsychinae/Trichoptera	0.99	0.69	0.23	0.58	0.86	0.87	0.70
Baetidae/Ephemeroptera	1.00	0.64	0.12	0.92	0.90	0.53	0.69
Biotic index	4.7	4.1	5.2	4.5	4.8	4.2	4.6
% Filterer	64	20	9	20	26	49	31
Density	122	277	255	620	486	581	390
EPT richness	10	11	13	13	13	14	12
Metals Tolerance index	4.5	5.1	3.8	5.2	5.6	4.9	4.8
Metric scores							
Taxa richness	1	2	3	3	3	4	3
Shannon diversity	5	6	6	6	6	6	6
EPT/EPTC	6	6	6	6	6	6	6
Hydropsychinae/Trichoptera	1	6	6	6	6	6	5
Baetidae/Ephemeroptera	0	6	6	3	4	6	4
Biotic index	4	5	3	5	4	5	4
% Filterer	3	6	6	6	6	6	6
Density (high)	*	*	*	6	*	6	6
Density (low)	1	3	3	6	5	6	4
EPT richness	3	3	3	3	3	4	3
Metals Tolerance index	5	4	6	4	4	5	5
Total	29	47	48	54	47	60	52
Organic subset	7	11	9	17	10	17	16
Metals subset	9	10	12	13	12	15	12
Bioassessment							
Overall	48%	78%	80%	82%	78%	91%	76%
Organic subset	58%	92%	75%	94%	83%	94%	83%
Metals subset	50%	56%	67%	72%	67%	83%	66%

* not calculated if density is < 550

Appendix D.8. Mean metric values and bioassessment scores for Clark Fork River Station 07 - August, 1986-92 (four Hess samples per year).

[illegible]

**Appendix D.9. Mean metric values and bioassessment scores for Clark Fork River
Station 08 - August, 1986-92 (four Hess samples per year).**

	1986	1987	1988	1989	1990	1991	1992	Mean
Metric values								
Taxa richness	22	21	28	20	26	28	33	25
Shannon diversity	2.7	2.8	2.3	2.1	3.7	3.6	3.2	2.9
EPT/EPTC	0.99	0.84	0.82	0.90	0.86	0.80	0.94	0.88
Hydropsychinae/Trichoptera	0.98	0.95	0.95	0.96	0.83	0.60	0.65	0.85
Baetidae/Ephemeroptera	0.79	0.94	0.40	0.37	0.70	0.43	0.81	0.63
Biotic index	4.6	5.1	4.6	5.0	4.8	4.6	5.1	4.8
% Filterer	59	57	56	68	36	18	37	47
Density	589	924	1981	1518	1335	840	1376	1223
EPT richness	10	10	12	9	12	15	17	12
Metals Tolerance index	4.9	5.7	5.2	4.8	5.1	4.7	4.8	5.0
Metric scores								
Taxa richness	2	2	3	2	3	3	4	3
Shannon diversity	4	4	3	2	6	6	5	4
EPT/EPTC	6	6	6	6	6	6	6	6
Hydropsychinae/Trichoptera	1	2	2	2	6	6	6	4
Baetidae/Ephemeroptera	6	2	6	6	6	6	6	5
Biotic index	4	4	4	4	4	4	4	4
% Filterer	4	4	4	2	6	6	6	5
Density (high)	6	6	6	6	6	6	6	6
Density (low)	6	6	6	6	6	6	6	6
EPT richness	3	3	3	2	3	4	4	3
Metals Tolerance index	5	4	4	5	4	5	5	5
Total	47	43	47	43	56	58	58	50
Organic subset	14	14	14	12	16	16	16	15
Metals subset	14	13	13	13	13	15	15	14
Bioassessment								
Overall	71%	65%	71%	65%	85%	88%	88%	76%
Organic subset	78%	78%	78%	67%	89%	89%	89%	81%
Metals subset	78%	72%	72%	72%	72%	83%	83%	76%

**Appendix D.10. Mean metric values and bioassessment scores for Clark Fork River
Station 08.5- August, 1990-92 (four Hess samples per year).**

	1990	1991	1992	Mean
Metric values				
Taxa richness	26	28	35	30
Shannon diversity	3.6	3.6	3.5	3.6
EPT/EPTC	0.74	0.80	0.70	0.75
Hydropsychinae/Trichoptera	0.78	0.60	0.35	0.58
Baetidae/Ephemeroptera	0.56	0.43	0.34	0.44
Biotic index	4.8	4.6	5.2	4.9
% Filterer	22	18	9	16
Density	1282	840	1155	1092
EPT richness	14	15	17	15
Metals Tolerance index	4.9	4.7	4.8	4.8
Metric scores				
Taxa richness	3	3	5	4
Shannon diversity	6	6	6	6
EPT/EPTC	6	6	6	6
Hydropsychinae/Trichoptera	6	6	6	6
Baetidae/Ephemeroptera	6	6	6	6
Biotic index	4	4	3	4
% Filterer	6	6	6	6
Density (high)	6	6	6	6
Density (low)	6	6	6	6
EPT richness	4	4	4	4
Metals Tolerance index	5	5	5	5
Total	58	58	59	58
Organic subset	16	16	15	16
Metals subset	15	15	15	15
Bioassessment				
Overall	88%	88%	89%	88%
Organic subset	89%	89%	83%	87%
Metals subset	83%	83%	83%	83%

**Appendix D.11. Mean metric values and bioassessment scores for Clark Fork River
Station 09 - August, 1986-92 (four Hess samples per year).**

	1986	1987	1988	1989	1990	1991	1992	Mean
Metric values								
Taxa richness	24	28	26	32	26	28	28	27
Shannon diversity	1.7	2.3	2.3	2.3	2.1	2.9	2.3	2.3
EPT/EPTC	0.98	0.95	0.77	0.87	0.94	0.91	0.94	0.91
Hydropsychinae/Trichoptera	1.00	0.96	0.99	0.93	0.96	0.70	0.99	0.93
Baetidae/Ephemeroptera	0.99	0.93	0.63	0.42	0.78	0.71	0.98	0.78
Biotic index	4.8	4.9	4.6	5.0	5.0	4.8	5.0	4.9
% Filterer	77	68	66	67	77	52	78	69
Density	1410	1555	3745	2150	3183	909	2283	2176
EPT richness	10	14	11	15	13	15	12	13
Metals Tolerance index	5.3	5.2	5.5	4.9	5.0	5.0	5.3	5.2
Metric scores								
Taxa richness	2	3	3	4	3	3	3	3
Shannon diversity	1	3	3	3	2	4	3	3
EPT/EPTC	6	6	6	6	6	6	6	6
Hydropsychinae/Trichoptera	0	2	1	3	2	6	1	2
Baetidae/Ephemeroptera	1	3	6	6	6	6	1	4
Biotic index	4	4	4	4	4	4	4	4
% Filterer	0	2	2	2	0	6	0	2
Density (high)	6	6	3	5	4	6	5	5
Density (low)	6	6	6	6	6	6	6	6
EPT richness	3	4	3	4	3	4	3	3
Metals Tolerance index	4	4	4	5	4	4	4	4
Total	33	43	41	48	40	55	36	42
Organic subset	10	12	9	11	8	16	9	11
Metals subset	13	14	13	15	13	14	13	14
Bioassessment								
Overall	50%	65%	62%	73%	61%	83%	55%	64%
Organic subset	56%	67%	50%	61%	44%	89%	50%	60%
Metals subset	72%	78%	72%	83%	72%	78%	72%	75%

**Appendix D.12. Mean metric values and bioassessment scores for Clark Fork River
Station 10 - August, 1986-92 (four Hess samples per year).**

	1986	1987	1988	1989	1990	1991	1992	Mean
Metric values								
Taxa richness	23	25	27	20	25	26	30	25
Shannon diversity	2.1	2.4	2.4	3.4	3.0	3.3	2.9	2.8
EPT/EPTC	0.92	0.93	0.62	0.82	0.77	0.91	0.92	0.84
Hydropsychinae/Trichoptera	0.99	0.94	0.87	0.53	0.73	0.44	0.95	0.78
Baetidae/Ephemeroptera	0.93	0.82	0.77	0.51	0.72	0.09	0.92	0.68
Biotic index	5.2	4.9	5.4	5.0	5.7	4.9	4.9	5.1
% Filterer	78	73	73	34	65	26	66	59
Density	3131	974	1688	448	1889	1615	1116	1552
EPT richness	11	14	12	11	14	15	15	13
Metals Tolerance index	5.3	5.4	4.9	4.9	5.5	4.7	5.2	5.1
Metric scores								
Taxa richness	2	3	3	2	3	3	4	3
Shannon diversity	2	3	3	6	5	5	4	4
EPT/EPTC	6	6	6	6	6	6	6	6
Hydropsychinae/Trichoptera	1	2	5	6	6	6	2	4
Baetidae/Ephemeroptera	3	6	6	6	6	6	3	5
Biotic index	3	4	3	4	3	4	4	4
% Filterer	0	1	1	6	3	6	2	3
Density (high)	4	6	6	*	6	6	6	6
Density (low)	6	6	6	4	6	6	6	6
EPT richness	3	4	3	3	4	4	4	4
Metals Tolerance index	4	4	5	5	4	5	4	4
Total	34	45	47	48	52	57	45	48
Organic subset	7	11	10	10	12	16	12	12
Metals subset	13	14	14	12	14	15	14	14
Bioassessment								
Overall	52%	68%	71%	80%	79%	86%	68%	72%
Organic subset	39%	61%	56%	83%	67%	89%	67%	66%
Metals subset	72%	78%	78%	67%	78%	83%	78%	76%

* not calculated if density is < 550

**Appendix D.13. Mean metric values and bioassessment scores for Clark Fork River
Station 11 - August, 1986-92 (four Hess samples per year).**

	1986	1987	1988	1989	1990	1991	1992	Mean
Metric values								
Taxa richness	29	30	35	32	25	34	37	32
Shannon diversity	3.3	2.9	3.8	2.9	3.2	3.6	3.4	3.3
EPT/EPTC	0.87	0.83	0.80	0.93	0.93	0.86	0.63	0.84
Hydropsychinae/Trichoptera	0.76	0.79	0.93	0.23	0.90	0.56	0.54	0.67
Baetidae/Ephemeroptera	0.50	0.49	0.40	0.20	0.92	0.18	0.24	0.42
Biotic index	4.8	5.1	4.2	4.9	5.2	5.0	5.9	5.0
% Filterer	42	63	41	23	68	34	47	45
Density	838	1073	396	965	457	1446	1781	994
EPT richness	15	17	18	18	13	19	17	17
Metals Tolerance index	4.8	5.1	4.5	4.6	5.5	5.1	5.5	5.0
Metric scores								
Taxa richness	3	4	5	4	3	4	4	4
Shannon diversity	5	4	6	4	5	6	6	5
EPT/EPTC	6	6	6	6	6	6	6	6
Hydropsychinae/Trichoptera	6	6	3	6	4	6	6	5
Baetidae/Ephemeroptera	6	6	6	6	3	6	6	6
Biotic index	4	4	5	4	3	4	2	4
% Filterer	6	3	6	6	2	6	6	5
Density (high)	6	6	*	6	*	6	6	6
Density (low)	6	6	4	6	5	6	6	6
EPT richness	4	4	5	5	3	5	4	4
Metals Tolerance index	5	4	5	5	4	4	4	4
Total	57	53	51	58	38	59	56	55
Organic subset	16	13	11	16	5	16	14	15
Metals subset	15	14	14	16	12	15	14	14
Bioassessment								
Overall	86%	80%	85%	88%	63%	89%	85%	82%
Organic subset	89%	72%	92%	89%	42%	89%	78%	79%
Metals subset	83%	78%	78%	89%	67%	83%	78%	79%

* not calculated if density is < 550

**Appendix D.14. Mean metric values and bioassessment scores for Clark Fork River
Station 12 - August, 1986-92 (four Hess samples per year).**

	1986	1987	1988	1989	1990	1991	1992	Mean
Metric values								
Taxa richness	26	34	31	29	23	37	34	31
Shannon diversity	2.2	3.1	2.4	3.0	2.3	2.2	2.5	2.5
EPT/EPTC	0.95	0.64	0.76	0.83	0.91	0.91	0.85	0.84
Hydropsychinae/Trichoptera	0.97	0.95	0.99	0.83	0.95	0.96	0.97	0.95
Baetidae/Ephemeroptera	0.94	0.48	0.90	0.87	0.92	0.92	0.98	0.86
Biotic index	4.8	5.1	4.7	5.2	5.0	5.0	5.2	5.0
% Filterer	63	52	69	60	72	74	67	65
Density	949	1228	8080	2227	1245	3153	3559	2920
EPT richness	13	16	15	15	13	17	15	15
Metals Tolerance index	4.7	4.8	4.8	5.1	5.1	5.2	5.1	5.0
Metric scores								
Taxa richness	3	4	4	3	2	5	4	4
Shannon diversity	3	5	3	5	3	3	3	4
EPT/EPTC	6	6	6	6	6	6	6	6
Hydropsychinae/Trichoptera	1	2	1	6	2	2	1	2
Baetidae/Ephemeroptera	2	6	4	5	3	3	1	3
Biotic index	4	4	4	3	4	4	3	4
% Filterer	3	5	2	4	1	1	2	3
Density (high)	6	6	0	5	6	4	3	4
Density (low)	6	6	6	6	6	6	6	6
EPT richness	3	4	4	4	3	4	4	4
Metals Tolerance index	5	5	5	4	4	4	4	4
Total	42	53	39	51	40	42	37	43
Organic subset	13	15	6	12	11	9	8	11
Metals subset	14	15	15	14	13	14	14	14
Bioassessment								
Overall	64%	80%	59%	77%	61%	64%	56%	66%
Organic subset	72%	83%	33%	67%	61%	50%	44%	59%
Metals subset	78%	83%	83%	78%	72%	78%	78%	79%

**Appendix D.15. Mean metric values and bioassessment scores for Clark Fork River
Station 13 - August, 1986-92 (four Hess samples per year).**

	1986	1987	1988	1989	1990	1991	1992	Mean
Metric values								
Taxa richness	32	34	41	31	31	50	49	38
Shannon diversity	3.7	3.3	3.1	3.7	3.6	4.1	3.5	3.6
EPT/EPTC	0.63	0.81	0.81	0.77	0.61	0.63	0.72	0.71
Hydropsychinae/Trichoptera	0.81	0.91	0.97	0.84	0.54	0.75	0.93	0.82
Baetidae/Ephemeroptera	0.40	0.69	0.84	0.48	0.22	0.40	0.87	0.56
Biotic index	4.8	4.7	4.4	4.7	5.2	5.0	4.8	4.8
% Filterer	44	68	65	50	27	34	55	49
Density	1539	1708	5636	1725	2145	2164	2757	2525
EPT richness	17	19	23	17	17	26	26	21
Metals Tolerance index	5.0	4.7	4.8	4.6	5.3	5.1	4.7	4.9
Metric scores								
Taxa richness	4	4	6	4	4	6	6	5
Shannon diversity	6	5	5	6	6	6	6	6
EPT/EPTC	6	6	6	6	6	6	6	6
Hydropsychinae/Trichoptera	6	3	1	6	6	6	3	4
Baetidae/Ephemeroptera	6	6	6	6	6	6	5	6
Biotic index	4	4	5	4	3	4	4	4
% Filterer	6	2	3	6	6	6	5	5
Density (high)	6	6	0	6	5	5	4	5
Density (low)	6	6	6	6	6	6	6	6
EPT richness	4	5	6	4	4	6	6	5
Metals Tolerance index	4	5	5	5	4	4	5	5
Total	58	52	49	59	56	61	56	56
Organic subset	16	12	8	16	14	15	13	13
Metals subset	14	16	17	15	14	16	17	16
Bioassessment								
Overall	88%	79%	74%	89%	85%	92%	85%	85%
Organic subset	89%	67%	44%	89%	78%	83%	72%	75%
Metals subset	78%	89%	94%	83%	78%	89%	94%	87%

**Appendix D.16. Mean metric values and bioassessment scores for Clark Fork River
Station 14 - August, 1986-92 (four Hess samples per year).**

	1986	1987	1988	1989	1990	1991	1992	Mean
Metric values								
Taxa richness	21	31	36	28	31	30	41	31
Shannon diversity	4.0	3.3	4.0	4.0	4.1	4.1	2.8	3.8
EPT/EPTC	0.76	0.37	0.59	0.77	0.88	0.88	0.20	0.64
Hydropsychinae/Trichoptera	0.62	0.84	0.73	0.79	0.74	0.65	0.77	0.73
Baetidae/Ephemeroptera	0.49	0.49	0.71	0.37	0.28	0.47	0.50	0.47
Biotic index	3.4	4.8	4.8	3.7	3.5	3.6	4.4	4.0
% Filterer	19	17	32	42	45	30	7	27
Density	65	414	382	192	408	170	975	372
EPT richness	14	18	20	17	20	20	23	19
Metals Tolerance index	3.0	2.9	3.8	3.4	3.6	3.7	2.9	3.3
Metric scores								
Taxa richness	2	4	5	3	4	4	6	4
Shannon diversity	6	5	6	6	6	6	4	6
EPT/EPTC	6	4	6	6	6	6	2	5
Hydropsychinae/Trichoptera	6	6	6	6	6	6	6	6
Baetidae/Ephemeroptera	6	6	6	6	6	6	6	6
Biotic index	6	4	4	6	6	6	5	5
% Filterer	6	6	6	6	6	6	6	6
Density (high)	*	*	*	*	*	*	6	6
Density (low)	1	4	4	2	4	2	6	3
EPT richness	4	5	5	4	5	5	6	5
Metals Tolerance index	6	6	6	6	6	6	6	6
Total	49	50	54	51	55	53	59	58
Organic subset	12	10	10	12	12	12	17	17
Metals subset	11	15	15	12	15	13	18	14
Bioassessment								
Overall	82%	83%	90%	85%	92%	88%	89%	87%
Organic subset	100%	83%	83%	100%	100%	100%	94%	94%
Metals subset	61%	83%	83%	67%	83%	72%	100%	79%

* not calculated if density is < 550

**Appendix D.17. Mean metric values and bioassessment scores for Clark Fork River
Station 15 - August, 1986-88 (four Hess samples per year).**

	1986	1987	1988	Mean
Metric values				
Taxa richness	34	40	46	40
Shannon diversity	3.4	3.9	3.6	3.6
EPT/EPTC	0.68	0.76	0.72	0.72
Hydropsychinae/Trichoptera	0.95	0.85	0.90	0.90
Baetidae/Ephemeroptera	0.62	0.84	0.77	0.74
Biotic index	4.7	4.9	4.6	4.7
% Filterer	51	53	49	51
Density	1430	1625	1263	1439
EPT richness	18	22	25	22
Metals Tolerance index	5.1	4.8	4.9	4.9
Metric scores				
Taxa richness	4	6	6	5
Shannon diversity	6	6	6	6
EPT/EPTC	6	6	6	6
Hydropsychinae/Trichoptera	2	6	4	4
Baetidae/Ephemeroptera	6	6	6	6
Biotic index	4	4	4	4
% Filterer	5	5	6	5
Density (high)	6	6	6	6
Density (low)	6	6	6	6
EPT richness	5	6	6	6
Metals Tolerance index	4	5	5	5
Total	54	62	61	59
Organic subset	15	15	16	15
Metals subset	15	17	17	16
Bioassessment				
Overall	82%	94%	92%	89%
Organic subset	83%	83%	89%	85%
Metals subset	83%	94%	94%	91%

**Appendix D.18. Mean metric values and bioassessment scores for Clark Fork River
Station 15.5 - August, 1989-92 (four Hess samples per year).**

	1989	1990	1991	1992	Mean
Metric values					
Taxa richness	29	25	32	39	31
Shannon diversity	3.4	2.8	3.2	3.7	3.3
EPT/EPTC	0.84	0.91	0.83	0.65	0.81
Hydropsychinae/Trichoptera	0.86	0.92	0.94	0.89	0.90
Baetidae/Ephemeroptera	0.71	0.51	0.82	0.96	0.75
Biotic index	4.3	4.1	4.5	5.0	4.5
% Filterer	67	79	64	53	66
Density	341	468	560	1841	803
EPT richness	18	16	16	21	18
Metals Tolerance index	4.3	4.0	4.6	5.2	4.5
Metric scores					
Taxa richness	3	3	4	5	4
Shannon diversity	6	4	5	6	5
EPT/EPTC	6	6	6	6	6
Hydropsychinae/Trichoptera	5	3	2	4	4
Baetidae/Ephemeroptera	6	6	6	2	5
Biotic index	5	5	5	4	5
% Filterer	2	0	3	6	3
Density (high)	*	*	6	6	6
Density (low)	3	5	6	6	5
EPT richness	5	4	4	5	5
Metals Tolerance index	5	5	5	4	5
Total	46	41	52	54	51
Organic subset	7	5	14	16	14
Metals subset	13	14	15	15	14
Bioassessment					
Overall	77%	68%	79%	82%	76%
Organic subset	58%	42%	78%	89%	67%
Metals subset	72%	78%	83%	83%	79%

* not calculated if density is < 550

**Appendix D.19. Mean metric values and bioassessment scores for Clark Fork River
Station 16 - August, 1986-88 (four Hess samples per year).**

	1986	1987	1988	Mean
Metric values				
Taxa richness	26	35	34	32
Shannon diversity	2.7	3.4	3.4	3.2
EPT/EPTC	0.93	0.83	0.87	0.88
Hydropsychinae/Trichoptera	0.92	0.93	0.89	0.91
Baetidae/Ephemeroptera	0.89	0.92	0.76	0.86
Biotic index	4.3	4.8	4.4	4.5
% Filterer	78	68	67	71
Density	693	1118	842	884
EPT richness	14	20	18	17
Metals Tolerance index	4.3	4.6	4.7	4.5
Metric scores				
Taxa richness	3	5	4	4
Shannon diversity	4	6	6	5
EPT/EPTC	6	6	6	6
Hydropsychinae/Trichoptera	3	6	4	4
Baetidae/Ephemeroptera	4	3	6	4
Biotic index	5	4	5	5
% Filterer	0	2	2	1
Density (high)	6	6	6	6
Density (low)	6	6	6	6
EPT richness	4	5	5	5
Metals Tolerance index	5	5	5	5
Total	46	54	55	52
Organic subset	11	12	13	12
Metals subset	15	16	16	16
Bioassessment				
Overall	70%	82%	83%	78%
Organic subset	61%	67%	72%	67%
Metals subset	83%	89%	89%	87%

**Appendix D-20. Mean metric values and bioassessment scores for Clark Fork River
Station 18 - August, 1986-92 (four Hess samples per year).**

	1986	1987	1988	1989	1990	1991	1992	Mean
Metric values								
Taxa richness	29	38	34	27	30	34	38	33
Shannon diversity	2.9	4.0	3.2	3.5	3.5	3.6	2.9	3.4
EPT/EPTC	0.90	0.79	0.90	0.82	0.86	0.75	0.91	0.85
Hydropsychinae/Trichoptera	0.96	0.75	0.71	0.92	0.73	0.81	0.83	0.82
Baetidae/Ephemeroptera	0.80	0.93	0.72	0.50	0.67	0.53	0.67	0.69
Biotic index	4.3	4.8	4.1	4.5	4.3	4.5	4.7	4.5
% Filterer	73	43	48	63	67	54	72	60
Density	584	1052	1360	830	932	627	1543	990
EPT richness	16	20	18	16	19	19	22	19
Metals Tolerance index	4.2	4.6	4.7	4.5	4.2	4.7	4.4	4.5
Metric scores								
Taxa richness	3	5	4	3	4	4	5	4
Shannon diversity	4	6	5	6	6	6	4	5
EPT/EPTC	6	6	6	6	6	6	6	6
Hydropsychinae/Trichoptera	2	6	6	3	6	6	6	5
Baetidae/Ephemeroptera	6	3	6	6	6	6	6	6
Biotic index	5	4	5	5	5	5	4	5
% Filterer	1	6	6	3	2	5	1	3
Density (high)	6	6	6	6	6	6	6	6
Density (low)	6	6	6	6	6	6	6	6
EPT richness	4	5	5	4	5	5	6	5
Metals Tolerance index	5	5	5	5	5	5	5	5
Total	48	58	60	53	57	60	55	56
Organic subset	12	16	17	14	13	16	11	14
Metals subset	15	16	16	15	16	16	17	16
Bioassessment								
Overall	73%	88%	91%	80%	86%	91%	83%	85%
Organic subset	67%	89%	94%	78%	72%	89%	61%	79%
Metals subset	83%	89%	89%	83%	89%	89%	94%	88%

**Appendix D-21. Mean metric values and bioassessment scores for Clark Fork River
Station 19 - August, 1986-92 (four Hess samples per year).**

	1986	1987	1988	1989	1990	1991	1992	Mean
Metric values								
Taxa richness	31	35	39	33	30	36	34	34
Shannon diversity	3.5	3.7	3.4	3.8	3.5	3.8	3.1	3.5
EPT/EPTC	0.83	0.77	0.81	0.80	0.91	0.72	0.68	0.79
Hydropsychinae/Trichoptera	0.96	0.91	0.96	0.73	0.83	0.89	0.92	0.89
Baetidae/Ephemeroptera	0.65	0.55	0.84	0.35	0.48	0.34	0.63	0.55
Biotic index	4.7	4.8	4.6	4.2	4.4	4.6	4.9	4.6
% Filterer	65	63	63	58	66	56	69	63
Density	890	1085	1243	792	936	810	1421	1025
EPT richness	16	20	21	19	17	18	18	18
Metals Tolerance index	4.7	4.4	4.8	3.8	4.4	4.9	4.7	4.5
Metric scores								
Taxa richness	4	5	5	4	4	5	4	4
Shannon diversity	6	6	6	6	6	6	5	6
EPT/EPTC	6	6	6	6	6	6	6	6
Hydropsychinae/Trichoptera	2	3	2	6	6	4	3	4
Baetidae/Ephemeroptera	6	6	6	6	6	6	6	6
Biotic index	4	4	4	5	5	4	4	4
% Filterer	3	3	3	4	2	4	2	3
Density (high)	6	6	6	6	6	6	6	6
Density (low)	6	6	6	6	6	6	6	6
EPT richness	4	5	5	5	4	5	5	5
Metals Tolerance index	5	5	5	6	5	5	5	5
Total	52	55	54	60	56	57	52	55
Organic subset	13	13	13	15	13	14	12	13
Metals subset	15	16	16	17	15	16	16	16
Bioassessment								
Overall	79%	83%	82%	91%	85%	86%	79%	84%
Organic subset	72%	72%	72%	83%	72%	78%	67%	74%
Metals subset	83%	89%	89%	94%	83%	89%	89%	88%

**Appendix D-22. Mean metric values and bioassessment scores for Clark Fork River
Station 20 - August, 1986-92 (four Hess samples per year).**

	1986	1987	1988	1989	1990	1991	1992	Mean
Metric values								
Taxa richness	28	33	31	29	28	32	39	31
Shannon diversity	2.9	3.2	2.5	3.5	3.1	3.3	3.2	3.1
EPT/EPTC	0.92	0.76	0.84	0.59	0.74	0.78	0.53	0.74
Hydropsychinae/Trichoptera	0.95	0.92	0.98	0.93	0.96	0.93	0.93	0.94
Baetidae/Ephemeroptera	0.86	0.84	0.85	0.66	0.72	0.62	0.83	0.77
Biotic index	4.7	4.9	4.5	5.4	5.2	4.7	5.4	5.0
% Filterer	68	68	74	52	64	61	47	62
Density	810	1519	4786	1391	1362	795	4369	2147
EPT richness	16	15	16	15	15	16	19	16
Metals Tolerance index	4.7	4.8	5.1	5.5	5.1	4.7	5.7	5.1
Metric scores								
Taxa richness	3	4	4	3	3	4	5	4
Shannon diversity	4	5	3	6	5	5	5	5
EPT/EPTC	6	6	6	6	6	6	5	6
Hydropsychinae/Trichoptera	2	3	1	3	2	3	3	2
Baetidae/Ephemeroptera	5	6	5	6	6	6	6	6
Biotic index	4	4	5	3	3	4	3	4
% Filterer	2	2	1	5	3	3	6	3
Density (high)	6	6	1	6	6	6	2	5
Density (low)	6	6	6	6	6	6	6	6
EPT richness	4	4	4	4	4	4	5	4
Metals Tolerance index	5	5	4	4	4	5	4	4
Total	47	51	40	52	48	52	50	49
Organic subset	12	12	7	14	12	13	11	12
Metals subset	15	15	14	14	14	15	15	15
Bioassessment								
Overall	71%	77%	61%	79%	73%	79%	76%	74%
Organic subset	67%	67%	39%	78%	67%	72%	61%	64%
Metals subset	83%	83%	78%	78%	78%	83%	83%	81%

**Appendix D-23. Mean metric values and bioassessment scores for Clark Fork River
Station 22 - August, 1986-92 (four Hess samples per year).**

	1986	1987	1988	1989	1990	1991	1992	Mean
Metric values								
Taxa richness	28	42	33	32	30	33	40	34
Shannon diversity	2.5	3.4	2.8	3.9	3.7	2.7	3.3	3.2
EPT/EPTC	0.94	0.79	0.82	0.63	0.70	0.83	0.50	0.74
Hydropsychinae/Trichoptera	0.99	0.93	0.97	0.86	0.79	0.99	0.94	0.92
Baetidae/Ephemeroptera	0.94	0.40	0.81	0.45	0.29	0.78	0.87	0.65
Biotic index	4.8	4.9	4.6	4.9	4.3	4.8	5.3	4.8
% Filterer	75	60	71	43	40	71	57	60
Density	1396	1452	2680	819	516	882	2902	1521
EPT richness	16	21	17	18	17	17	20	18
Metals Tolerance index	4.9	4.9	4.9	4.5	4.0	4.9	5.0	4.7
Metric scores								
Taxa richness	3	6	4	4	4	4	6	4
Shannon diversity	3	6	4	6	6	4	5	5
EPT/EPTC	6	6	6	6	6	6	5	6
Hydropsychinae/Trichoptera	1	3	1	5	6	1	2	3
Baetidae/Ephemeroptera	2	6	6	6	6	6	5	5
Biotic index	4	4	4	4	5	4	3	4
% Filterer	1	4	1	6	6	1	4	3
Density (high)	6	6	4	6	*	6	4	5
Density (low)	6	6	6	6	5	6	6	6
EPT richness	4	5	4	5	4	4	5	4
Metals Tolerance index	5	5	5	5	5	5	4	5
Total	41	57	45	59	53	47	49	51
Organic subset	11	14	9	16	11	11	11	13
Metals subset	15	16	15	16	14	15	15	15
Bioassessment								
Overall	62%	86%	68%	89%	88%	71%	74%	77%
Organic subset	61%	78%	50%	89%	92%	61%	61%	70%
Metals subset	83%	89%	83%	89%	78%	83%	83%	84%

* not calculated if density is < 550

**Appendix D-24. Mean metric values and bioassessment scores for Clark Fork River
Station 23 - August, 1986-92 (four Hess samples per year).**

	1986	1987	1988	1989	1990	1991	1992	Mean
Metric values								
Taxa richness	32	32	34	35	29	37	40	34
Shannon diversity	3.1	2.7	2.8	3.4	3.3	3.0	3.5	3.1
EPT/EPTC	0.94	0.90	0.87	0.74	0.89	0.86	0.71	0.84
Hydropsychinae/Trichoptera	0.93	0.96	0.96	0.92	0.89	0.97	0.91	0.93
Baetidae/Ephemeroptera	0.86	0.65	0.58	0.49	0.68	0.61	0.41	0.61
Biotic index	4.6	4.9	4.3	5.0	4.8	4.8	5.1	4.8
% Filterer	70	82	71	63	66	72	51	68
Density	990	1638	1927	1506	956	1068	1995	1440
EPT richness	20	15	20	18	18	20	21	19
Metals Tolerance index	4.5	4.5	4.9	4.7	4.4	5.0	4.6	4.6
Metric scores								
Taxa richness	4	4	4	5	3	5	6	4
Shannon diversity	5	4	4	6	5	5	6	5
EPT/EPTC	6	6	6	6	6	6	6	6
Hydropsychinae/Trichoptera	3	2	2	3	4	1	3	3
Baetidae/Ephemeroptera	5	6	6	6	6	6	6	6
Biotic index	4	4	5	4	4	4	4	4
% Filterer	2	0	1	3	2	1	5	2
Density (high)	6	6	6	6	6	6	6	6
Density (low)	6	6	6	6	6	6	6	6
EPT richness	5	4	5	5	5	5	5	5
Metals Tolerance index	5	5	5	5	5	4	5	5
Total	51	47	50	55	52	49	58	52
Organic subset	12	10	12	13	12	11	15	12
Metals subset	16	15	16	16	16	15	16	16
Bioassessment								
Overall	77%	71%	76%	83%	79%	74%	88%	78%
Organic subset	67%	56%	67%	72%	67%	61%	83%	67%
Metals subset	89%	83%	89%	89%	89%	83%	89%	87%

**Appendix D-25. Mean metric values and bioassessment scores for Clark Fork River
Station 24 - August, 1986-92 (four Hess samples per year).**

	1986	1987	1988	1989	1990	1991	1992	Mean
Metric values								
Taxa richness	31	34	36	28	33	33	44	34
Shannon diversity	3.5	3.5	3.3	2.8	3.8	3.8	3.7	3.5
EPT/EPTC	0.84	0.76	0.80	0.84	0.81	0.83	0.70	0.80
Hydropsychinae/Trichoptera	0.73	0.96	0.97	0.91	0.86	0.90	0.90	0.89
Baetidae/Ephemeroptera	0.80	0.54	0.61	0.42	0.53	0.70	0.19	0.54
Biotic index	4.4	5.0	4.7	4.8	4.6	4.5	4.9	4.7
% Filterer	55	61	61	74	56	54	49	59
Density	537	1100	2738	1088	725	463	955	1087
EPT richness	18	17	20	17	22	19	26	20
Metals Tolerance index	3.9	4.6	4.4	4.7	4.4	4.7	4.6	4.5
Metric scores								
Taxa richness	4	4	5	3	4	4	6	4
Shannon diversity	6	6	5	4	6	6	6	6
EPT/EPTC	6	6	6	6	6	6	6	6
Hydropsychinae/Trichoptera	6	2	1	3	5	4	4	4
Baetidae/Ephemeroptera	6	6	6	6	6	6	6	6
Biotic index	5	4	4	4	4	5	4	4
% Filterer	5	3	3	1	4	5	6	4
Density (high)	*	6	4	6	6	*	6	6
Density (low)	5	6	6	6	6	5	6	6
EPT richness	5	4	5	4	6	5	6	5
Metals Tolerance index	6	5	5	5	5	5	5	5
Total	54	52	50	48	58	51	61	55
Organic subset	10	13	11	11	14	10	16	14
Metals subset	16	15	16	15	17	15	17	16
Bioassessment								
Overall	90%	79%	76%	73%	88%	85%	92%	83%
Organic subset	83%	72%	61%	61%	78%	83%	89%	75%
Metals subset	89%	83%	89%	83%	94%	83%	94%	88%

* not calculated if density is < 550

**Appendix D-26. Mean metric values and bioassessment scores for Clark Fork River
Station 25 - August, 1986-92 (four Hess samples per year).**

	1986	1987	1988	1989	1990	1991	1992	Mean
Metric values								
Taxa richness	25	31	37	27	29	35	40	32
Shannon diversity	3.4	3.3	3.3	3.4	3.8	3.8	3.7	3.5
EPT/EPTC	0.79	0.66	0.66	0.61	0.58	0.71	0.64	0.66
Hydropsychinae/Trichoptera	0.70	0.90	0.96	0.98	0.91	0.96	0.91	0.90
Baetidae/Ephemeroptera	0.58	0.60	0.60	0.41	0.33	0.31	0.22	0.44
Biotic index	4.5	5.0	4.8	4.9	4.9	4.7	5.0	4.8
% Filterer	50	53	57	64	63	55	54	57
Density	249	1102	2097	1030	672	633	1355	1020
EPT richness	14	15	20	15	17	16	20	17
Metals Tolerance index	3.7	3.9	3.9	4.3	3.8	4.6	4.7	4.1
Metric scores								
Taxa richness	3	4	5	3	3	5	6	4
Shannon diversity	6	5	5	6	6	6	6	6
EPT/EPTC	6	6	6	6	6	6	6	6
Hydropsychinae/Trichoptera	6	4	2	1	3	2	3	3
Baetidae/Ephemeroptera	6	6	6	6	6	6	6	6
Biotic index	5	4	4	4	4	4	4	4
% Filterer	6	5	4	3	3	5	5	4
Density (high)	*	6	5	6	6	6	6	6
Density (low)	2	6	6	6	6	6	6	5
EPT richness	4	4	5	4	4	4	5	4
Metals Tolerance index	6	6	6	5	6	5	5	6
Total	50	56	54	50	53	55	58	55
Organic subset	11	15	13	13	13	15	15	14
Metals subset	12	16	17	15	16	15	16	15
Bioassessment								
Overall	83%	85%	82%	76%	80%	83%	88%	82%
Organic subset	92%	83%	72%	72%	72%	83%	83%	80%
Metals subset	67%	89%	94%	83%	89%	83%	89%	85%

* not calculated if density is < 550

**Appendix D-27. Mean metric values and bioassessment scores for Clark Fork River
Station 27 - August, 1987-92 (four Hess samples per year).**

	1987	1988	1989	1990	1991	1992	Mean
Metric values							
Taxa richness	26	26	21	29	31	23	26
Shannon diversity	2.9	2.8	2.6	2.9	2.9	2.7	2.8
EPT/EPTC	0.79	0.91	0.58	0.83	0.87	0.79	0.80
Hydropsychinae/Trichoptera	0.96	0.94	0.98	0.91	0.93	0.98	0.95
Baetidae/Ephemeroptera	0.34	0.31	0.24	0.54	0.37	0.04	0.31
Biotic index	5.2	5.0	5.3	4.8	4.7	5.1	5.0
% Filterer	67	78	75	76	69	73	73
Density	525	851	838	520	486	627	641
EPT richness	12	12	9	17	18	9	13
Metals Tolerance index	4.9	4.5	4.2	4.2	5.1	3.9	4.5
Metric scores							
Taxa richness	3	3	2	3	4	2	3
Shannon diversity	4	4	4	4	4	4	4
EPT/EPTC	6	6	6	6	6	6	6
Hydropsychinae/Trichoptera	2	2	1	3	3	1	2
Baetidae/Ephemeroptera	6	6	6	6	6	6	6
Biotic index	3	4	3	4	4	4	4
% Filterer	2	0	1	0	2	1	1
Density (high)	*	6	6	*	*	6	6
Density (low)	5	6	6	5	5	6	6
EPT richness	3	3	2	4	5	2	3
Metals Tolerance index	5	5	5	5	4	6	5
Total	39	45	42	40	43	44	45
Organic subset	5	10	10	4	6	11	11
Metals subset	13	14	13	14	14	14	14
Bioassessment							
Overall	65%	68%	64%	67%	72%	67%	67%
Organic subset	42%	56%	56%	33%	50%	61%	50%
Metals subset	72%	78%	72%	78%	78%	78%	76%

* not calculated if density is < 550

